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HEAD-TO-TOE ASSESSMENT

INSPECT

PALPATE

PERCUSS

AUSCULTATE

Introduction

- Knock
- Introduce yourself
- Wash hands
- Provide privacy
- Verify patient ID and DOB
- Explain what you are doing (using non-medical language)

Orientation

- What is your name?
- Do you know where you are?
- Do you know what month it is?
- Who is the current U.S. president?
- What are you doing here?
- A&O X4 = Oriented to Person, Place, Time, and Situation

"Normal" Vital Signs

PULSE: 60-100 bpm

BLOOD PRESSURE: 120/80 mmHg

O2 SATURATION: 95-100%

TEMPERATURE: 97.8-99.1° F

RESPIRATIONS: 12-20 breaths per min

Head & Face

HEAD

- Inspect head/scalp/hair
- Palpate head/scalp/hair

FACE

- Inspect
- Check for symmetry
  - To assess Cranial Nerve 7, check the following:
    - Raise eyebrows
    - Smile
    - Frown
    - Show teeth
    - Puff out cheeks
    - Tightly close eyes

EYES

- Inspects external eye structures
- Inspect color of conjunctiva and sclera
- PERRLA
  - **P**upils **E**qual, **R**ound, **R**eactive to **L**ight, & **A**ccommodation

Neck, Chest (Lungs) & Heart

NECK

- Inspect and palpate
- Palpate carotid pulse
- Check skin turgor (under clavicle)

POSTERIOR CHEST

- Inspect
- Auscultate lung sounds in posterior and lateral chest
  - Note any crackles or diminished breath sounds

ANTERIOR CHEST

- Inspect:
  - Use of accessory muscles
  - AP to transverse diameter
  - Sternum configuration
- Palpate: symmetric expansion
- Auscultate lung sounds – anterior and lateral
  - Note any crackles or diminished breath sounds

HEART

- Auscultate heart sounds (A, P, E, T, M) with diaphragm and bell
  - Note any murmurs, whooshing, bruits, or muffled heart sounds

Peripherals

PERIPHERALS

Upper extremities

- Inspect and palpate.
- Note any texture, lesions, temperature, moisture, tenderness, & swelling
- Palpate radial pulses bilaterally (+1, +2, +3, +4)

SHOULDER

- Inspect, palpate, and assess

ELBOWS

- Inspect, palpate, and assess

HANDS AND FINGERS

- Inspect hands/fingers/nails
- Palpate hands and finger joints
- Check muscle strength of hands bilaterally
  - Does each hand grip evenly?

+1 = Diminished
+2 ="Normal"
+3 =Full
+4 =Bounding, strong

Spine

- Have the patient stand up (if able)
- Inspect the skin on the back
- Inspect: spinal curvature (cervical/thoracic/lumbar)
- Palpate spine
- Note any lesions, lumps, or abnormalities

Lower Extremities (hips, knees, ankles)

LOWER EXTREMITIES

- Inspect:
  - Overall skin coloration
  - Lesions
  - Hair distribution
  - Varicosities
  - Edema
- Palpate: Check for edema (pitting or non-pitting)
- Check capillary refill bilaterally

HIPS

- Inspect and palpate

KNEES

- Inspect and palpate

ANKLES

- Inspect and palpate
- Post tibial pulse (+1, +2, +3, +4)
- Dorsal pedis pulse bilaterally (+1, +2, +3, +4)
  - Check strength bilaterally
    - Dorsiflexion flexion against resistance

Abdomen

- Inspect:
  - Skin color
  - Contour
  - Scars
  - Aortic pulsations
- Auscultate bowel sounds: all 4 quadrants (start in RLQ and go clockwise)
- Light palpation: all 4 quadrants

ABSENT: Must listen for at least 5 minutes to chart absent bowel sounds

HYPOACTIVE: One bowel sound every 3-5 minutes

NORMOACTIVE: Gurgles 5-30 time per minute

HYPERACTIVE: Can sometimes be heard without a stethoscope constant bowel sounds, > 30 sounds per minute

OVERALL

- Positions and drapes patient appropriately during exam (gave patient privacy)
- Gave patient feedback/instructions
- Exhibits professional manner during exam, treated patient with respect and dignity
- Organized: exam followed a logical sequence (order of exam "made sense")

DOSAGE CALCULATION

BROUGHT TO YOU BY NURSE in the making

ABBREVIATIONS

TIMES OF MEDICATIONS

ac	before meals
pc	after meals
daily	every day
bid	two times a day
tid	three times a day
qid	four times a day
qh	every hour
ad lib	as desired
stat	immediately
q2h	every 2 hours
q4h	every 4 hours
q6h	every 6 hours
prn	as needed
hs	at bedtime

EXAMPLE

A patient is receiving 1 mg tid.
How many mg will they receive in one day?

Remember: tid = 3X a day
Answer: if they are receiving 1 mg for 3X a day, that's 1 mg x 3 = 3 mg per day

ROUTES OF ADMINISTRATION

PO	by mouth
IM	intramuscularly
PR	per rectum
SubQ	subcutaneously
SL	sublingual
ID	intradermal
GT	gastrostomy tube
IV	intravenous
IVP	intravenous push
IVPB	intravenous piggyback
NG	nasogastric tube

DRUG PREPARATION

tab, tabs	tablet
cap, caps	capsule
gtt	drop
EC	enteric coated
CR	controlled release
susp	suspension
el, elix	elixir
sup, supp	suppository
SR	sustained release

METRIC

g (gm, Gm)	gram
mg	milligram
mcg	microgram
kg (Kg)	kilogram
L	liter
mL	milliliter
mEq	milliequivalent

APOTHECARY AND HOUSEHOLD

gtt	drop
min, m, mx	minim
tsp	teaspoon
pt	pint
gal	gallon
dr	dram
oz	ounce
T, tbs, tbsp	tablespoon
qt	quart

CONVERSIONS

BASED ON VOLUME

1 mg = 1,000 mcg
1 g = 1,000 mg
1 oz = 30 mL
8 oz = 1 cup
1 tsp = 5 mL
1 dram = 5 mL
1 tbsp = 15 mL
1 tbsp = 3 tsp
1 L = 1,000 mL
1 mL = 5 gtts (drops)

THE METRIC SYSTEM

Large unit to small unit → move decimal to the right
Small unit to large unit → move decimal to the left

TIP Moving to a larger unit? Move the decimal place to the Left
(Ex: mcg → mg) (Larger unit think Left)

EXAMPLE

1500 mcg = _____mg

A "mg" is larger (Larger unit think Left) than a "mcg"
Therefore you move decimal 3 places to the Left

1500. mcg = 1.500 mg (1.5 mg)

BASED ON WEIGHT

1 kg = 2.2 lbs
1 lb = 16 oz

lb → kg **DIVIDE** by 2.2

Example:
120 lbs = _____kg

120 lbs / 2.2 = 54.545 kg

kg → lb **MULTIPLY** by 2.2

Example:
45.6 kg = ______lb

45.6 kg x 2.2 = 100.32 lb

DOSAGE CALC RULES

KEY

Medication errors kill,
PREVENTION is crucial!

1 **Show ALL your work.**

2 **Leading zeros must be placed before any decimal point.**

The decimal point may be missed without the zero

EXAMPLE

.2 mg should be **0.2** mg

WHY? .2 could appear to be 2
(0.2 mg of morphine is VERY different than 2 mg of morphine!)

3 **No trailing zeros.**

0.7 mL NOT 0.70 mL

1 mg NOT 1.0 mg

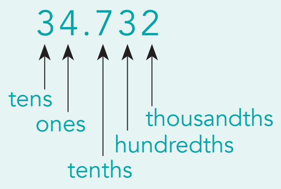
WHY? 1.0 could appear to be 10!

4 **DO NOT round until you have the final anwser!**

HOW TO ROUND YOUR FINAL ANSWER

If the number in the thousands place **is 5 or greater**	→	The # in the hundredth place is rounded up EXAMPLES: 1.995 mg is rounded to 2 mg 1.985 mg is rounded to 1.99 mg
If the number in the thousands place **is 4 or less**	→	The # is dropped EXAMPLE: 0.992 mg is rounded to 0.99 mg

DECIMAL REFERENCE GUIDE



5 **Most nursing schools, if not all, do not give partial credit.**

(THIS MEANS EVERY STEP MUST BE DONE CORRECTLY!)

FORMULA METHOD

(FOR VOLUME-RELATED DOSAGE ORDERS)

$$\frac{D}{H} \times V = A$$

D = DESIRED

Example: "The physician orders **120 mg**..."

NOTE:

Some medications like Heparin and Insulin are prescribed in units/hour

H = DOSAGE OF MEDICATION AVAILABLE

Example: "The medication is supplied as **100 mg**/5 mL"

V = VOLUME THE MEDICATION IS AVAILABLE IN

Example: "The medication is supplied as 100 mg/**5 mL**"

A = AMOUNT OF MEDICATION REQUIRED FOR ADMINISTRATION

Your answer

KEY

You should assume that all questions are asked "**per dose**" unless the question gives a timeframe (example: "how many tablets will you give in 24 hours?")

EXAMPLE 1

Ordered: Drug C 150 mg
Available: Drug C 300 mg/tab
How many tablets should be given?

$$\frac{D}{H} \times V = A$$

What's our desired? Drug C 150mg PO
What do we have? Drug C 300mg/tab
What's our quantity/volume? tablets

150 ~~mg~~ ÷ 300 ~~mg~~ x 1 tab = 0.5 tabs

150 ÷ 300 = 0.5 x 1 = 0.5 tabs

FINAL ANSWER: 0.5 tabs

EXAMPLE 2

Ordered: Drug C 10,000 units SubQ
Available: Drug C 5,000 units/mL
How many mL should be given?

$$\frac{D}{H} \times V = A$$

What's our desired? Drug C 10,000 SubQ
What do we have? Drug C 5,000 units
What's our quantity/volume? 1 mL

10,000 ~~units~~ ÷ 5,000 ~~units~~ x 1 mL = 2 mL

10,000 ÷ 5,000 = 2 x 1 = 2 mL

FINAL ANSWER: 2 mL

IV FLOW RATES

mL / hour

$$\frac{\text{mL of solution}}{\text{total hours}} = \text{mL/hr}$$

NOTE: If the question is asking for flow rate and you're given units of mL, you need to write the answers in **mL/hr!**

NOTE: mL/hr is always rounded to the nearest whole number!

What if the question is given in minutes?

Since there are 60 minutes in one hour, use this formula:

$$\frac{\text{mL of solution}}{\text{min}} \times \underset{\text{(minutes)}}{60} = \text{mL/hr}$$

EXAMPLE #1

Ordered: 1000 mL D5W to infuse over 3 hours. What will the flow rate be?

$$\frac{1000\text{ mL}}{3\text{ hr}} = 333.333\text{ mL/hr}$$

ANSWER: **333 mL/hr**

(rounded to the nearest whole number)

EXAMPLE #2

Ordered: Infuse 3 grams of Penicillin in 50 mL normal saline over 30 minutes.

$$\frac{50\text{ mL}}{30\ \cancel{\text{min}}} \times 60\ \cancel{\text{min}} = 100\text{ mL/hr}$$

ANSWER: **100 mL/hr**

gtt / min

$$\frac{\text{mL of solution}}{\text{total minutes}} \times \text{drop factor} = \text{gtt/min}$$

NOTE: If a drop factor is included, the question is asking for flow rate in gtt/min.

You need to write the answers in **gtt/minute**!

Remember our abbreviations:
gtt means "drop"!

What if the question is given in hours?

Convert hours to minutes!

For example: 1 hours = 60 minutes
2.5 hours = 150 minutes

EXAMPLE #1

Ordered: 1000 mL of Lactated Ringer's to infuse at 50 mL/hr. Drop factor for tubing is a 5 gtt/mL. (*Convert: 1 hour = 60 min)*

$$\frac{50\ \cancel{\text{mL}}}{60\text{ min}} \times 5\text{ gtt/}\cancel{\text{mL}} = 4\text{ gtt/min}$$

50 ÷ 60 = 0.833 x 5 = 4.166

Round to the nearest whole number → **4**

FINAL ANSWER: 4 gtt/min

NOTE: Remember Rule #4 Don't round till the end!

EXAMPLE #2

Ordered: 100 mL of Metronidazole to infuse over 45 minutes. The tubing you are using has a drop factor of 10 gtt/mL.

$$\frac{100\ \cancel{\text{mL}}}{45\text{ min}} \times 10\text{ gtt/}\cancel{\text{mL}} = 22\text{ gtt/min}$$

100 ÷ 45 = 2.222 x 10 = 22.222

Round to the nearest whole number → **22**

FINAL ANSWER: 22 gtt/min

NOTE: Remember Rule #4 Don't round till the end!

PRACTICE QUESIONS

Do all 10 questions without looking at the correct answers on the following pages. Don't forget to show all your work. After you are done, walk through each question…even the questions you got correct!

1

ORDERED: Rosuvastatin 3000 mcg PO ac
AVAILABLE: Rosuvastatin 2 mg tablet (scored)
How many tabs will you administer in 24 hours?

$$\frac{3{,}000\,\text{mcg} \times 1\,\text{tab}}{\overset{000}{2}\,\text{mcg}} = 1.5$$

2

ORDERED: Tylenol supp 2 g PR q6h
AVAILABLE: Tylenol supp 700 mg
How many supp will you administer?
Round to nearest tenth.

$$\frac{\overset{000}{2g} \times 1\,\text{sup}}{700\,\text{mg}} = 2.857$$

3

ORDERED: Potassium cholride 0.525 mEq/lb PO
dissolved in 6 oz of juice at 0930
AVAILABLE: Potassium cholride 12 mEq/mL
How many mL of potassium chloride will you add to the juice for a 66.75 kg patient? Round to nearest tenth.

4

1000 mL D5W to infuse over 4 hours.

5

150 mL Cipro 250 mcg
to infuse over 45 minutes.

6

250 mL normal saline over 5 hours.
Tubing drop factor of 10 gtt/mL.

$$\frac{10\,\text{gtt}}{1\,\text{mL}} \left| \frac{250\,\text{mL}}{5\,\text{hr}} \right| \frac{1\,\text{hr}}{60\,\text{min}} = 8.33$$

7

Humulin R 200 units in 100 mL of normal saline to infuse at 4 units/hr.

8

Dopamine 600 mg in 200 mL of normal saline to infuse at 10mcg/kg/min. Pt weight = 190 lbs.

9

2.5 L normal saline to infuse over 48 hours.

10

ORDERED: Morphine 100 mg IM q12h prn pain
AVAILABLE: Morphine 150 mg/2.6 mL
How many mL will you administer?
Round to nearest hundredth.

COMPREHENSIVE REVIEW

1

ORDERED: Rosuvastatin 3000 mcg PO ac
AVAILABLE: Rosuvastatin 2 mg tablet (scored)

How many tabs will you administer in 24 hours?

STEP 1: CONVERT DATA

mcg → mg

3000 mcg = 3 mg

Remember: small to big, move the decimal point 3 to the left (unit is getting **L**arger think **L**eft)

STEP 2: READY TO USE DATA

Ordered: 3 mg
Available: 2 mg
Volume: 1 tab
Administered ac: before each meal
Question is asking: dosage in 24 hours

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{3\ \cancel{mg}}{2\ \cancel{mg}} = 1.5$$

1.5 x 1 tab = 1.5

1.5 x 3 = 4.5 tabs per day

NOTE:
Don't forget to check times of medication! The medication is ordered to be given AC, which means before each meal. Since there are 3 meals in a day (24 hours), the answer must be multiplied by 3.

ROUND: *No rounding necessary*

FINAL ANSWER: 4.5 tabs

2

ORDERED: Tylenol supp 2 g PR q6h
AVAILABLE: Tylenol supp 700 mg

How many supp will you administer? Round to nearest tenth.

STEP 1: CONVERT DATA

g → mg

2g = 2000 mg

Remember: big to small, move the decimal point 3 to the right

STEP 2: READY TO USE DATA

Ordered: 2000 mg
Available: 700 mg
Volume: 1 supp

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{2000\ \cancel{mg}}{700\ \cancel{mg}} = 2.857$$

NOTE:
Remember Rule #4
Don't round till the end!

2.857 x 1 supp = 2.857 supp

ROUND: *Nearest tenth*

2.857 supp → 2.9 supp

FINAL ANSWER: 2.9 supp

COMPREHENSIVE REVIEW

3

ORDERED: Potassium chloride 0.525 mEq/lb PO
dissolved in 6 oz of juice at 0930
AVAILABLE: Potassium chloride 12 mEq/mL

How many mL of potassium chloride will you add to the juice for a 66.75 kg patient? Round to nearest tenth.

STEP 1: CONVERT DATA

kg → lb

$66.75\ \cancel{kg} \times 2.2\ (lb/\cancel{kg}) = 146.85\ lb$

NOTE:
In this case, ordered amount depends on patient weight

mEq/lb → mEq

$(\ 0.525\ mEq/\cancel{lb} \times 146.85\ \cancel{lb} = 77.096\ mEq\ )$

STEP 2: READY TO USE DATA

Ordered: 77.096 mEq
Available: 12 mEq
Volume: 1 mL

STEP 3: IRRELEVANT DATA

Dissolved in 12 oz of juice at 0930

KEY
Question asked for "per dose" because no timeframe was given

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{77.096\ \cancel{mEq}}{12\ \cancel{mEq}} = 6.424$$

NOTE:
Remember rule #4
Don't round till the end!

6.424 X 1 mL = 6.424 mL

ROUND: *Nearest tenth*

6.424 mL → 6.4 mL

FINAL ANSWER: 6.4 mL

4

1000 mL D5W to infuse over 4 hours.

STEP 1: CONVERT DATA

N/A

STEP 2: READY TO USE DATA

1000 mL
4 hr

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{\text{mL of solution}}{\text{total hours}} = \text{mL/hr}$$

SHOW YOUR WORK

$$\frac{1000\ mL}{4\ hr} = 250\ mL/hr$$

NOTE:
mL/hr is always rounded to nearest whole number!

ROUND: *No rounding necessary*

FINAL ANSWER: 250 mL/hr

COMPREHENSIVE REVIEW

5

150 mL Cipro 250 mcg to infuse over 45 minutes.

Remember:
If the question is asking for flow rate ("to infuse") and you're given mL of solution, you need to write the answer in **mL/hours!**

STEP 1: CONVERT DATA

N/A

STEP 2: READY TO USE DATA

mL of solution: 150 mL
total hours: 45 min

STEP 3: IRRELEVANT DATA

Cipro 250 mcg

Important: don't let this information lead you to use the wrong formula. In this example, we're asked for a flow rate which requires mL of solution and total time.

STEP 4: FORMULA USED

$$\frac{\text{mL of solution}}{\text{total minutes}} \times 60 = \text{mL/hr}$$

SHOW YOUR WORK

$$\frac{150\text{ mL}}{45\text{ min}} = 3.333 \times 60 = 200\text{ mL/hr}$$

NOTE:
Remember rule #4
Don't round till the end!

NOTE:
mL/hr is always rounded to nearest whole number!

ROUND: *No rounding necessary*

FINAL ANSWER: 200mL/hr

6

250 mL normal saline over 5 hours. Tubing drop factor of 10 gtt/mL.

STEP 1: CONVERT DATA

hr → min

1 hour = 60 minutes

$$5\,\cancel{\text{hr}} \times \frac{60\text{ min}}{1\,\cancel{\text{hr}}} = 300\text{ min}$$

STEP 2: READY TO USE DATA

mL of solution: 250 mL
total minutes: 300 min
Drop factor: 10 gtt/mL

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{\text{mL of IV solution}}{\text{time in minutes}} \times \text{drop factor} = \text{gtt/min}$$

SHOW YOUR WORK

$$\frac{250\text{ mL}}{300\text{ min}} = 0.8333\text{ mL/min}$$

NOTE:
Don't round till the end!

$$0.8333\ \cancel{\text{mL}}\text{/min} \times 10\text{ gtt/}\cancel{\text{mL}} = 8.3333\text{ gtt/min}$$

ROUND: *gtt/mL is always rounded to the nearest whole number!*

8.3333 gtt/min → 8 gtt/min

NOTE:
The question may not specify to round the final answer to a whole number; you are expected to know this with gtt/min units.

FINAL ANSWER: 8 gtt/min

COMPREHENSIVE REVIEW

7

Humulin R 200 units in 100 mL of normal saline to infuse at 4 units/hr.

STEP 1: CONVERT DATA

N/A

STEP 2: READY TO USE DATA

Desired: 4 units/hr
Available: 200 units
Volume: 100 mL

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{4\ \cancel{\text{units}}/\text{hr}}{200\ \cancel{\text{units}}} = 0.02\ /\text{hr}$$

0.02 /hr x 100 mL = 2 mL/hr

NOTE: mL/hr is always rounded to nearest whole number!

ROUND: *No rounding necessary*

FINAL ANSWER: 2 mL/hr

8

Dopamine 600 mg in 200 mL of normal saline to infuse at 10 mcg/kg/min.
Pt weight = 190 lbs.

Remember: If the question is asking for flow rate ("to infuse") and you're given mL of solution, you need to write the answer in **mL/hr!**

STEP 1: CONVERT DATA

mcg → mg

10 mcg = 0.010 mg

Remember: Small to big: move the decimal point 3 to the left (unit is getting Larger think Left)

lb → kg

190 lb / 2.2 = 86.363 kg

KEY

In this case, ordered amount depends on patient weight

$$\frac{\text{mg/kg}}{\text{min}} \rightarrow \frac{\text{mg}}{\text{min}}$$

$0.010\ \text{mg}/\cancel{\text{kg}}/\text{min} \times 86.363\ \cancel{\text{kg}} = 0.863\ \text{mg/min}$

STEP 2: READY TO USE DATA

Desired: 0.863 mg/min
Available: 600 mg
Volume: 200 mL

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{0.863\ \cancel{\text{mg}}/\text{min}}{600\ \cancel{\text{mg}}} = 0.00143\ /\text{min}$$

0.00143 /min x 200 mL = 0.2878 mL/min

$0.2878\ \text{mL}/\cancel{\text{min}} \times 60\ \cancel{\text{min}} = 17.2727\ \text{mL/hr}$

WAIT! This is mL/min... we need units of mL/hr!

ROUND: *mL/hr is always rounded to nearest whole number!*

17.2727 mL/hr → 17 mL/hr

FINAL ANSWER: 17 mL/hr

COMPREHENSIVE REVIEW

9

2.5 L normal saline to infuse over 48 hours.

Remember:
If the question is asking for flow rate ("to infuse") and you're given mL of solution, you need to write the answer in **mL/hours!**

STEP 1: CONVERT DATA

L → mL

Remember: big to small, move the decimal point 3 to the right

2.5 L = 2500 mL

STEP 2: READY TO USE DATA

mL of solution: 2500 mL
total hours: 48 hr

STEP 3: IRRELEVANT DATA

N/A

STEP 4: FORMULA USED

$$\frac{\text{mL of solution}}{\text{total hours}} = \text{mL/hr}$$

SHOW YOUR WORK

$$\frac{2500\ \text{mL}}{48\ \text{hours}} = 52.0833\ \text{mL/hr}$$

ROUND: *mL/hr is always rounded to nearest whole number!*

52.0833 mL/hr → 52 mL/hr

FINAL ANSWER: 52 mL/hr

10

ORDERED: Morphine 100 mg IM q12h prn pain
AVAILABLE: Morphine 150 mg/2.6 mL
How many mL will you administer?
Round to nearest hundredth.

STEP 1: CONVERT DATA

N/A

STEP 2: READY TO USE DATA

Ordered: 100 mg
Available: 150 mg
Volume: 2.6 mL

STEP 3: IRRELEVANT DATA

IM q12h prn pain

KEY

Question asked for "per dose" because no timeframe was given

STEP 4: FORMULA USED

$$\frac{D}{H} \times V = A$$

SHOW YOUR WORK

$$\frac{100\ \cancel{\text{mg}}}{150\ \cancel{\text{mg}}} = 0.6666$$

0.6666 x 2.6 mL = 1.7333 mL

ROUND: *nearest hundredth*

1.7333 mL → 1.73 mL

FINAL ANSWER: 1.73 mL

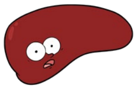
LAB VALUE CHEAT SHEET

VITAL SIGNS

- Blood pressure
  - Systolic: 120 mmHg
  - Diastolic: 80 mmHG
- Heart Rate: 60 - 100 BPM
- Respirations: 12 - 20 Breaths per min
- Oxygen: 95% - 100%
- Temperature: 97.8 °F - 99 °F

LIVER FUNCTION TEST (LFT)

- ALT: 7 - 56 U/L
- AST: 5 - 40 U/L
- ALP: 40 - 120 U/L
- Bilirubin: 0.1 - 1.2 mg/dL



PANCREAS

- Amylase: 30 - 110 U/L
- Lipase: 0 - 150 U/L

COAGs

- PT: 10 - 13 sec
- PTT: 25 - 35 sec
- aPTT: 30 - 40 sec (heparin)
- INR
  - NOT ON Warfarin < 1 sec
  - ON Warfarin 2 - 3 sec

	Measured with	Therapeutic Range	Antidote
HEPARIN	aPTT	1.5 - 2.0 x normal "control" value	Protamine Sulfate
WARFARIN	PT/INR	1.5 - 2.0 x normal "control" value	Vitamin K

*The higher these numbers = higher chance of bleeding

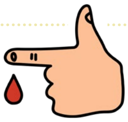
BASAL METABOLIC PANEL (BMP)

- Sodium: 135 – 145 mEq/L
- Potassium: 3.5 – 5.0 mEq/L
- Chloride: 95 - 105 mEq/L
- Calcium: 9 - 11 mg/dL
- BUN: 7 - 20 mg/dL
- Creatinine: 0.6 – 1.2 mg/dL
- Albumin: 3.4 - 5.4 g/dL
- Total protein: 6.2 - 8.2 g/dL

LIPID PANEL

- Total cholesterol: <200 mg/dL
- Triglyceride: <150 mg/dL
- LDL: <100 mg/dL → Bad cholesterol
- HDL: >60/dL → Happy cholesterol

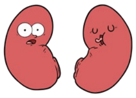
HbA1c



- Non-diabetic: 4 - 5.6%
- Pre-diabetic: 5.7 - 6.4%
- Diabetic: > 6.5% (GOAL for diabetic: < 6.5%)

RENAL

- Calcium: 9 - 11 mg/dL
- Magnesium: 1.5 - 2.5 mg/dL
- Phosphorus: 2.5 - 4.5 mg/dL
- Specific gravity: 1.010 - 1.030
- GFR: 90 - 120 mL/min/1.73 m^2
- BUN: 7 - 20 mg/dL
- Creatinine: 0.6 – 1.2 mg/dL



ABG'S

- PH: 7.35 - 7.45
- PaCO2: 35 - 45 mmHg
- PaO2: 80 - 100 mmHg
- HCO3: 22 - 26 mEq/L

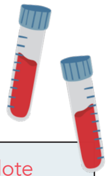
REMEMBER

ROME →

Respiratory
Opposite
Metabolic
Equal

COMPLETE BLOOD COUNT (CBC)

- WBC: 4,500 - 11,000
- RBC's: 4.5 - 5.5
- PLT: 150,000 - 450,000
- Hemoglobin (Hgb)
  Female: 12 - 16 g/dL *Male:* 13 - 18 g/dL
- Hematocrit (HCT)
  Female: 36% - 48% *Male:* 39% - 54%



OTHER

- MAP: 70 - 100 mmHg
- ICP (intracranial pressure): 5 - 15 mmHg
- BMI: 18.5 - 24.9
- Glascow coma scale: Best = 15
  Mild: 13-15 Moderate: 9-12 Severe: 3-8

LAB VALUE MEMORY TRICKS

ELECTROLYTES

SODIUM: 135 - 145

*Commit to memory!

POTASSIUM: 3.5 - 5

BANANAS:
There are about 3-5 in every bunch & you want them half ripe (½)

So, think 3.5 - 5.0

PHOSPHORUS: 2.5 - 4.5

PHOR: 4
US: 2 (me + you = 2)

*don't forget the .5

CALCIUM: 9 - 11

CALL 911

MAGNESIUM: 1.5 - 2.5

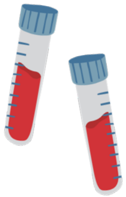
MAGnifying glass you see 1.5 - 2.5 bigger than normal

CHLORIDE: 95 -105

Think of a chlorinated pool that you want to go in when it's SUPER HOT: 95 - 105 °F

COMPLETE BLOOD COUNT (CBC)

- Hemoglobin (Hgb)
  Female: 12 - 16 g/dL
  Male: 13 - 18 g/dL
- Hematocrit (HCT)
  Female: 36% - 48%
  Male: 39% - 54%



To remember HCT, multiply Hgb by 3

12 X 3 = 36
16 X 3 = 48
(Female)

13 X 3 = 39
18 X 3 = 54
(Male)

BASAL METABOLIC PANEL (BMP)

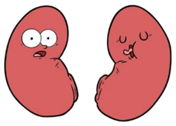
BUN: 7 - 20 mg/dL

Think hamburger **BUN**s...
Hamburgers can cost anywhere from $7 - $20 dollars

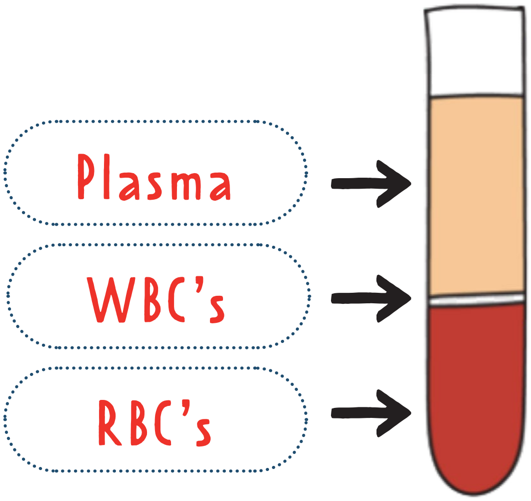
CREATININE: 0.6 – 1.2 mg/dL

This is the same value as **LITHIUM'**s therapeutic range (0.6 - 1.2 mmol/L)

Lithium is excreted almost solely by the kidneys...
And creatinine is a value that tests how well your kidneys filter



BLOOD TYPES



ANTIGENS:

Proteins that elicit immune response

Identifies the cell

PLASMA ANTIBODIES

Protects body from "invaders" (think ANTI)

Opposite of the type of antigen that is found on the RBC

	A	B	AB	O
			Universal RECIPIENT	Universal DONOR
Antigen:	A	B	A & B	NONE
Antibodies:	B	A	NONE	A & B
Recipient:	A, O	B, O	ALL	O
Donor:	A, AB	B, AB	AB	ALL

Rh FACTOR

⊕	Has Rh on surface	Can receive	⊕ ⊖
⊖	Does not have Rh on surface	Can receive	⊖

SODIUM IMBALANCE

SODIUM is a major **ELECTROLYTE found in ECF. Essential for acid-base, fluid balance, active & passive transport mechanism, irritability & CONDUCTION of nerve-muscle tissue**

135 - 145 mEq/L

↑ HYPERNATREMIA

> 145 mEq/L

SIGNS & SYMPTOMS

BIG & BLOATED

- **F**lushed skin
- **R**estless, anxious, confused, irritable
- **I**ncreased BP & fluid retention
- **E**dema (pitting)
- **D**ecreased urine output

- **S**kin flushed & dry
- **A**gitation
- **L**ow-grade fever
- **T**hirst (dry mucous membranes)

RISK FACTORS

- Increased sodium intake
  - Excess oral sodium ingestion
  - Excess administration of IV fluids w/ sodium
  - Hypertonic IV fluids
- LOSS OF FLUIDS!
  - Fever
  - Watery diarrhea
  - Diabetes insipidus
  - Excessive diaphoresis
  - Infection
- Decreased sodium excretion
  - Kidney problems

HEMOCONCENTRATION = INCREASED SODIUM!

MANAGEMENT

- If due to fluid loss:
  - Administer IV infusions
- If the cause is inadequate renal excretion of sodium:
  - Give diuretics that promote sodium loss
- Restrict sodium & fluid intake as prescribed

↓ HYPONATREMIA

< 135 mEq/L

HYPOVOLEMIC HYPONATREMIA:
↓ of fluid & sodium

HYPERVOLEMIC HYPONATREMIA:
↑ body water that is greater than Na+

SIGNS & SYMPTOMS

- **S**tupor/coma
- **A**norexia (nausea/vomitting)
- **L**ethargy (weakness/fatigue)
- **T**achycardia (thready pulse)

- **L**imp muscles (muscle weakness)
- **O**rthostatic hypotension
- **S**eizures/headache
- **S**tomach cramping (hyperactive bowels)

RISK FACTORS

5 D'S

- Increased sodium excretion
  - **D**iaphoresis (ex: high fever)
  - **D**iuretics
  - **D**iarrhea & vomiting
  - **D**rains (NGT suction)
  - **D**iuretics (Thiazides & loop diuretics)
- SIADH
- Adrenal insufficient (adrenal crisis)
- Inadequate sodium intake
  - Fasting, NPO, Low-salt diet
- Kidney disease
- Heart failure

MANAGEMENT

A D D S A L T

- **A** **ADMINISTER** IV sodium chloride infusions (Only if due to hypovolemia)
- **D** **DIURETICS** (If due to hypervolemia)
  Hyponatremia → high fluids & low salt = hemodilution
- **D** **DAILY WEIGHTS**
  Where sodium goes, water FLOWS
- **S** **SAFETY** (orthostatic hypotension AKA risk for falls)
- **A** **AIRWAY PROTECTION** (NPO)
  Don't give food to a lethargic, confused client (INCREASED RISK FOR ASPIRATION)
- **L** **LIMIT WATER INTAKE**
  Hypervolemic hyponatremia (high fluid & low salt)
- **T** **TEACH** to avoid a diet high in salt
  (Canned food, packaged/processed meats, etc.)

POTASSIUM IMBALANCE

POTASSIUM imbalance plays a vital role in cell METABOLISM, and TRANSITION of nerve impulses, the functioning of cardiac, lung, muscle tissues, & acid-base balance.

3.5 - 5 mEq/L

↑ HYPERKALEMIA > 5 mEq/L

↓ HYPOKALEMIA < 3.5 mEq/L

SIGNS & SYMPTOMS

Hyperkalemia

- TIGHT & CONTRACTED
  - **M** uscle cramps & weakness
  - **U** rine abnormalities
  - **R** espiratory distress
  - **D** ecreased cardiac contractility (↓HR, ↓BP)
  - **E** CG changes
    - Tall peaked T waves
    - Flat P waves
    - Widened QRS complexes
    - Prolonged PR intervals
  - **R** eflexes (↑ DTR)

Hypokalemia

- Thready, weak, irregular pulse
- Orthostatic hypotension
- Shallow respirations
- Anxiety, lethargy, confusion, coma
- Paresthesias
- Hyporeflexia
- Hypoactive bowel sounds (constipation)
- Nausea, vomiting, abdominal distention
- ECG changes
  - ST depression
  - Shallow or inverted T wave
  - Prominent U wave

RISK FACTORS

Hyperkalemia

- Medication
  - ➥ Potassium-sparing diuretics (Spironolactone)
  - ➥ Ace inhibitors
  - ➥ NSAIDs
- Excessive potassium intake
  (Example: rapid infusion of potassium-containing IV solutions)
- Kidney disease or those on Dialysis
  - ➥ Decreased potassium excretion
- Adrenal insufficiency (Addison's disease)
- Tissue damage
- Acidosis
- Hyperuricemia
- Hypercatabolism

Hypokalemia

- Actual total body potassium loss
- Inadequate potassium intake
  - ➥ Fasting, NPO
- Movement of potassium from the extracellular fluid to the intracellular fluid
  - ➥ Alkalosis
  - ➥ Hyperinsulinism
- Dilution of serum potassium
  - ➥ Water intoxication
  - ➥ IV therapy with potassium-deficient solutions

⚠ POTASSIUM IMBALANCE CAN CAUSE CARDIAC DYSRHYTHMIAS THAT CAN BE LIFE-THREATENING!

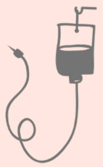
MANAGEMENT

Hyperkalemia

- Monitor EKG
- Discontinue IV & PO potassium
- Initiate a potassium-restricted diet
- Potassium-excreting diuretics
- Prepare the client for dialysis
- Prepare for administration:
  - ➥ IV calcium gluconate & IV sodium bicarb
- Avoid the use of salt substitutes or other potassium-containing substances

Hypokalemia

- Oral potassium supplements
- Liquid potassium chloride
- Potassium-retaining diuretic
- Potassium is **NEVER** administered by IV push, IM, or subcut routes.
  - ➥ IV potassium is always diluted & administered using an infusion device!



POTASSIUM & SODIUM = OPPOSITES **EXAMPLE: ↑ NA = ↓ K+**

CALCIUM IMBALANCE

CALCIUM is found in the body's cells, bones, and teeth. Needed for proper functioning of the CARDIOVASCULAR, NEUROMUSCULAR, ENDOCRINE systems, blood clotting & teeth formation

9 - 11 mg/dL

↑ HYPERCALCEMIA > 11 mg/dL

↓ HYPOCALCEMIA < 9 mg/dL

SIGNS & SYMPTOMS

- **B**one pain
- **A**rrhythmias
- **C**ardiac arrest (bounding pulses)
- **K**idney stones
- **M**uscle weakness ↓ (DTR)
- **E**xcessive urination

- **C**onvulsions
- **A**rrhythmias (dimished pulses)
- **T**etany
- **S**pasms & stridor
- **GO NUMB**ness in the fingers, face, & limbs

POSITIVE TROUSSEAU'S:
Carpal spasm caused by inflating a blood pressure cuff

CHVOSTEK'S SIGNS:
Contraction of facial muscles w/ light tap over the facial nerve.

THINK "**C**" FOR **C**HEESY SMILE

RISK FACTORS

- Increased calcium absorption
- Decreased calcium excretion
- Kidney disease
- Thiazide diuretics
- Increased bone resorption of calcium
  - Hyperparathyroidism / Hyperthyroidism
  - Malignancy (bone destruction from metastatic tumors)
- Hemoconcentration

- Inhibition of calcium absorption from the GI tract
- Increased calcium excretion
  - Kidney disease, diuretic phase
  - Diarrhea & steatorrhea
  - Wound drainage
- Conditions that decrease the ionized fraction of calcium

MANAGEMENT

- D/C IV or PO calcium
- D/C Thiazide diuretics
- Administer phosphorus, calcitonin, bisphosphonates, & prostaglandin synthesis inhibitors (NSAIDs)
- Avoid foods high in calcium

- Adm. calcium PO or IV
  - For IV, warm before & adm. slowly
- Adm. aluminum hydroxide & Vit D
- Initiate seizure precautions
- 10% calcium (acute calcium deficit)
- Consume foods high in calcium

A CLIENT WITH A CALCIUM IMBALANCE IS AT RISK FOR A PATHOLOGICAL FRACTURE. MOVE THE CLIENT CAREFULLY AND SLOWLY

CALCIUM & PHOSPHATE = INVERSE EXAMPLE: ↑ CA+ = ↓ PO4

MAGNESIUM IMBALANCE

Most of the MAGNESIUM found in the body is found in the bones. Regulates BP, blood sugar, muscle contraction & nerve function.

1.5 - 2.5 mg/dL

↑ HYPERMAGNESEMIA > 2.5 mg/dL

↓ HYPOMAGNESEMIA < 1.5 mg/dL

MEMORY TRICK: MAGNESIUM IS A SEDATIVE!

SIGNS & SYMPTOMS

LOW EVERYTHING AKA **SEDATED**

- **Low energy** (drowsiness / coma)
- **Low HR** (bradycardia)
- **Low BP** (hypotension)
- **Low RR** (bradypnea)
- **↓ Respirations** (shallow)
- **↓ Bowel sounds**
- **↓ DTR's** (deep tendon reflex)

HIGH EVERYTHING AKA **NOT SEDATED**

- **High HR** (tachycardia)
- **High BP** (hypertension)
- **Increased deep tendon reflex** (hyperreflexia)
- **Shallow respirations**
- **Twitches, paresthesias**
- **Tetany & seizures**
- **Irritability & confusion**

REMEMBER: Also seen in hypocalcemia. Ca & Mg rise and fall together!

POSITIVE TROUSSEAU'S:
Carpal spasm caused by inflating a blood pressure cuff

CHVOSTEK'S SIGNS:
Contraction of facial muscles w/ light tap over the facial nerve

RISK FACTORS

- **Increased magnesium intake**
  - ➥ Magnesium-containing antacids (TUMS) & laxatives
  - ➥ Excessive adm. of magnesium IV
- **Renal insufficiency**
  - ➥ ↓ renal excretion of Mg = ↑ Mg in the blood
- **DKA (Diabetic Ketoacidosis)**

- **Insufficient magnesium intake**
  - ➥ Malnutrition/vomiting/diarrhea
  - ➥ Malabsorption syndrome
  - ➥ Celiac & Chron's disease
- **Increased magnesium excretion**
  - ➥ Diuretics or chronic alcoholism
- **Intracellular movement of magnesium**
  - ➥ Hyperglycemia & Insulin adm.
  - ➥ Sepsis

MANAGEMENT

- Diuretics
- IV adm. calcium chloride or calcium gluconate
- Restrict dietary intake of Mg containing foods
- Avoid the use of laxatives & antacids containing magnesium
- Hemodialysis

- Magnesium sulfate IV or PO
- Seizure precautions
- Instruct the client to increase magnesium-containing foods

MAGNESIUM & CALCIUM = SAME **EXAMPLE: ↑ MG = ↑ CA+**

FUNDAMENTALS OF NURSING

ABBREVIATIONS

Abd	Abdomen
A.B.G.	Arterial blood gas
ADL	Activity of daily living
a.c	Before meals
A&O	Alert & oriented
BP	Blood pressure
d/c	Discontinue
H&H	Hemoglobin & hematocrit
DNR	Do not resuscitate
DX	Diagnosis
ECG	Electrocardiogram
Fx	Fracture
h.s	At bedtime
HOB	Head of bed
HOH	Hard of hearing
H&P	History & physical
HR	Heart rate
ICU	Intensive care unit
I&O	Intake & output
IM	Intramuscular
IV	Intravenous
NGT	Nasogastric tube
NPO	Nothing by mouth
CPR	Cardiopulmonary resuscitation
PPE	Personal protective equipment
PO	By mouth
p.r.n.	As needed
ROM	Range of motion
S&S	Signs & symptoms
Stat	Immediately
U/A	Urinalysis
V/S	Vital signs
PERRLA	Pupils equal, round, & reactive to light & accommodation

DO NOT USE	POTENTIAL PROBLEM	INSTEAD, WRITE:
U	Mistaken for “0” (zero) or “cc”	unit
IU	Mistaken for IV (intravenous) or the number 10 (ten)	"international unit"
Q.D., QD, q.d., qd, Q.O.D.,QOD, q.o.d, qod	Mistaken for each other	"daily" or "every other day"
Trailing zero (X.0 mg) Lack of leading zero (.X mg)	Decimal point is missed	"X mg" "0.X mg"
MS, MSO4, MgSO4	Can mean morphine sulfate or magnesium sulfate	"morphine sulfate" "magnesium sulfate"
@	Mistaken for the number “2” (two)	“at”
cc	Mistaken for U (units) when poorly written	“mL” or “milliliters”

THE NURSING PROCESS

"A DELICIOUS PIE"

SUBJECTIVE DATA

What the client tells the nurse

OBJECTIVE DATA

Data the nurse obtains through their assessment & observation

SET SMART GOALS

- **S**PECIFIC
- **M**EASURABLE
- **A**CHIEVABLE
- **R**ELEVANT
- **T**IME FRAME

ASSESS

Gather information

Verify the information collected is clear & accurate

DIAGNOSE

Interpret the information collected

Identify & prioritize the problem through a nursing diagnosis (be sure it's NANDA approved)

PLAN

Set goals to solve the problem.

Prioritize the outcomes of care

IMPLEMENT

Reaching those goals through performing the nursing actions

"Implementing" the goals set above in the planning stage

EVALUATE

Determine the outcome of goals

Evaluate client's compliance

Document client's response to pain

Modify & assess for needed changes

PRIORITY QUESTIONS

ABC's

A AIRWAY
B BREATHING
C CIRCULATION

YOU KNOW YOU ARE BEING ASKED A PRIORITY QUESTION WHEN THE QUESTION ASKS:

- What is the most important?
- What is the initial response?
- Which action should the nurse take first?

When you see these questions,
you should immediately think of
MASLOW'S HIERARCHY OF NEEDS
as well as **ABC'S**!

#1 PATENT AIRWAY

- **Patent means "open"; the airway is clear!**
- *ASK YOURSELF: Can they successfully breathe oxygen in and breathe CO2 out?*

#2 BREATHING

- **Gas exchange taking place inside the lungs**
- *ASK YOURSELF: Can gas exchange successfully happen in their lungs?*

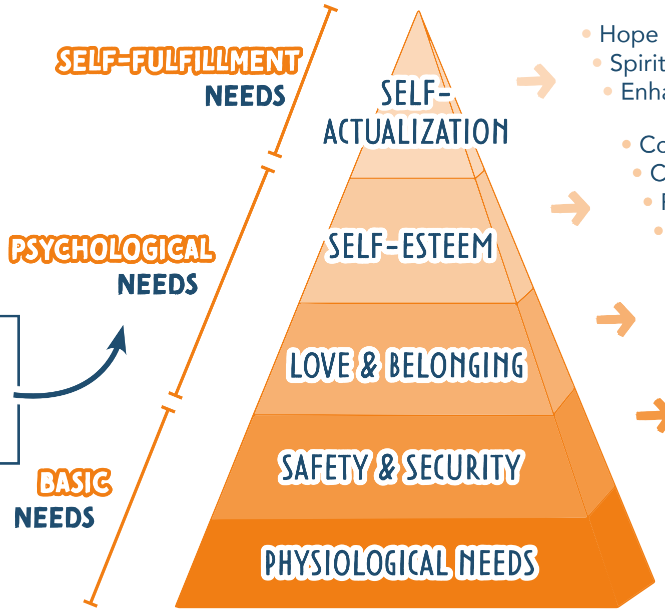
#3 CIRCULATION

- **Can they circulate blood through their body and are their organs being perfused?**
- *ASK YOURSELF: Is there a reason that the blood isn't pumping/circulating in the body?* (Example: The heart is working to pump the blood to the vital organs)

MASLOW'S HIERARCHY OF BASIC NEEDS

This shows the 5 levels of human needs

PHYSIOLOGICAL NEEDS being the most important (Oxygen, fluids, nutrition, shelter). **ABC'S** fall into Maslow's **PHYSIOLOGICAL** need!



- Hope
- Spiritual well-being
- Enhanced growth

- Control
- Competence
- Positive regard
- Acceptance/worthiness

- Maintain support systems
- Protect from isolation

- Protection from injury
- Promote feeling of security
- Trust in nurse-client relationship

- Airway
- Respiratory effort
- Heart rate, rhythm, and strength of contraction
- Nutrition
- Elimination

NCLEX TIP

Pain is considered "**psychological**" meaning it does not take priority.
*Pain rarely kills people

NURSING ETHICS & LAW

ETHICAL PRINCIPLES

AUTONOMY

Respect for an individual's right to make their own decisions

NONMALEFICENCE

Obligation to do & cause no harm to others

BENEFICENCE

Duty to do good to others

JUSTICE

Distribution of benefits & services fairly

VERACITY

Obligation to tell the truth

FIDELITY

Following through with a promise

HIPAA

THE HEALTH INSURANCE PORTABILITY & ACCOUNTABILITY ACT

➜ Clients records are private & they have the right to ensure the medical information is not shared without permission

➜ All health care professionals must inform the client how their health information is used

➜ The client has the right to obtain a copy of their personal health information

PATIENT RIGHTS

THE RIGHT TO...

➜ Privacy

➜ Considerate & respectful care

➜ Be informed

➜ Know the names & roles of the persons who are involved in care

➜ Consent or refuse treatment

➜ Have an advance directive

➜ Obtain their own medical records & results

CONSENT

TYPES OF CONSENT:

- Admission agreement
- Immunization consent
- Blood transfusion consent
- Surgical consent
- Research consent
- Special consents

➜ Treatment can not be done without a client's consent

➜ In the case of an emergency when a client cannot give consent, then consent is implied through emergency laws

➜ Minors (under 18), consent must be obtained from a parent or legal guardian

!

Before signing the consent, the client must be informed of the following: risks & benefits of surgery, treatments, procedures, & plan of care in layman's terms so the client understands clearly what is being done.

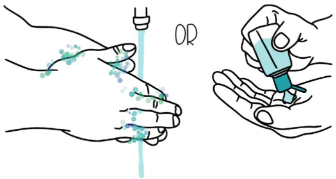
INFECTION CONTROL

PPE → PERSONAL PROTECTIVE EQUIPMENT

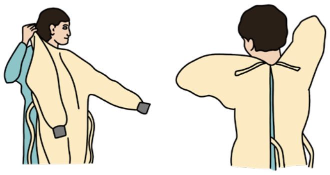
DONNING
PUTTING ON PPE

- Put on PPE before entering the client's room
- Do not touch your face while wearing PPE
- Avoid touching areas in the client's room

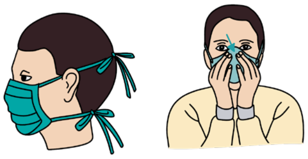
1 **HAND HYGIENE**



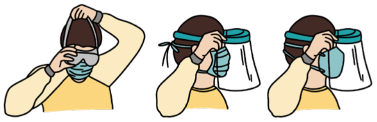
2 **GOWN**



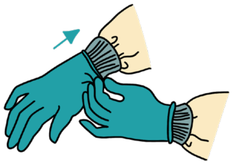
3 **MASK / RESPIRATOR**



4 **GOGGLES / FACE SHIELD**



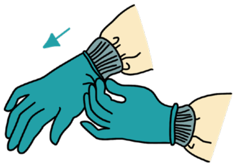
5 **GLOVES**



DOFFING
REMOVING PPE

- Remove PPE at the client's doorway or outside the room
- If hands become soiled while removing PPE, stop & perform hand hygiene. Then, continue with PPE removal.

1 **GLOVES**



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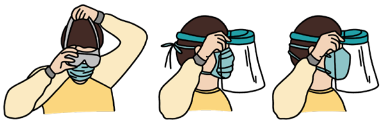
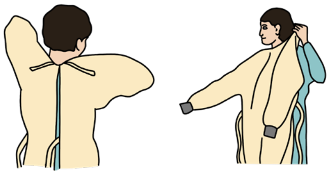
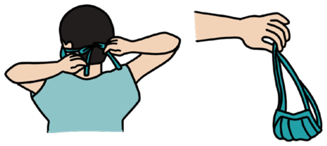


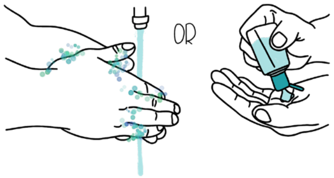
3 **GOWN**



4 **MASK / RESPIRATOR**



5 **HAND HYGIENE**

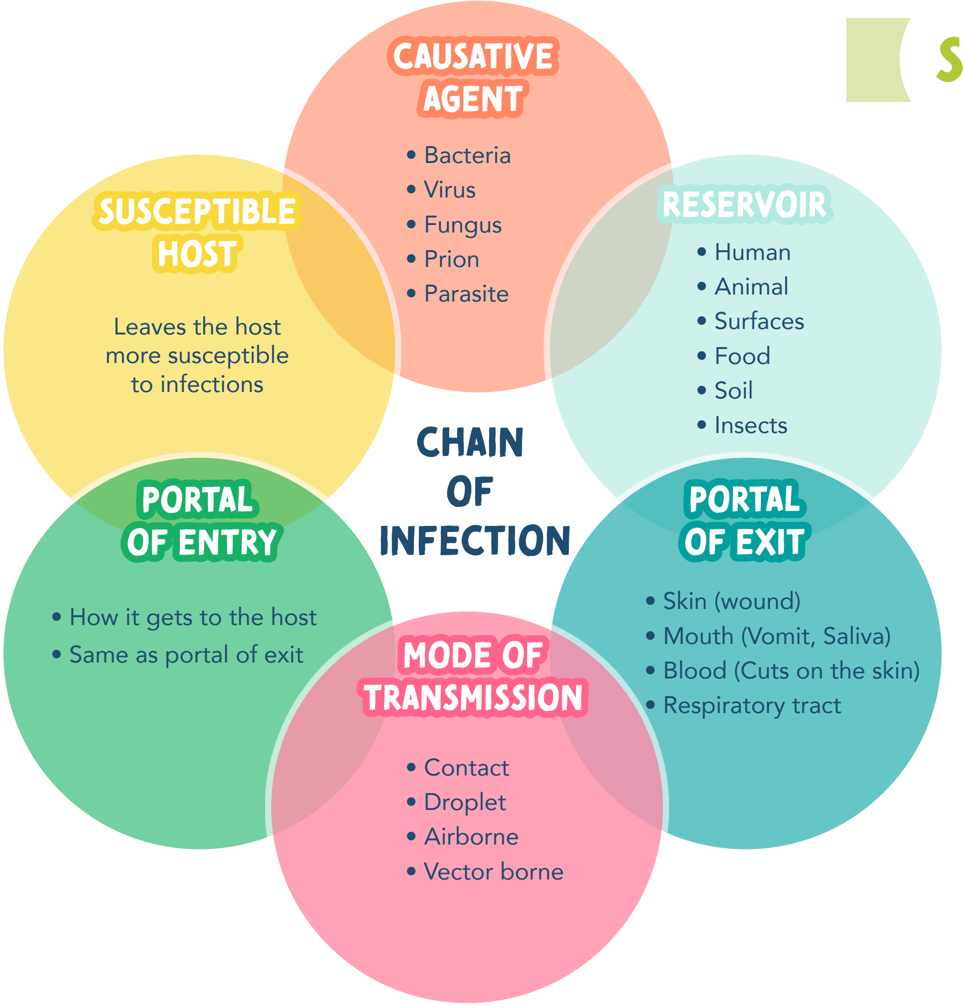


HOSPITAL-ASSOCIATED INFECTIONS

HAI	Hospital-associated infection
CAUTI	Catheter-associated urinary tract infection
SSI	Surgical site infection
CLABSI	Central line-associated blood infection
VAP	Ventilator-associated pneumonia

Meticulous hand hygiene practices and use of chlorhexidine washes helps in preventing HAI's

INFECTION CONTROL



CHAIN OF INFECTION

CAUSATIVE AGENT

- Bacteria
- Virus
- Fungus
- Prion
- Parasite

RESERVOIR

- Human
- Animal
- Surfaces
- Food
- Soil
- Insects

PORTAL OF EXIT

- Skin (wound)
- Mouth (Vomit, Saliva)
- Blood (Cuts on the skin)
- Respiratory tract

MODE OF TRANSMISSION

- Contact
- Droplet
- Airborne
- Vector borne

PORTAL OF ENTRY

- How it gets to the host
- Same as portal of exit

SUSCEPTIBLE HOST

Leaves the host more susceptible to infections

STAGES OF INFECTION

INCUBATION

Interval between the pathogen entering the body & the presentation of the first symptom

PRODROMAL STAGE

Onset of general symptoms to more distant symptoms; the pathogen is multiplying

ILLNESS STAGE

Symptoms specific to the infection appear

CONVALESCENCE

Acute symptoms disappear and total recovery could take days to months

TRANSMISSION BASED PRECAUTIONS

AIRBORNE

- Single room under negative pressure
- Door remains closed
- Health care workers wear a respiratory mask (N95 or higher level)

Measles

Tuberculosis

Varicella (Chickenpox)
& Disseminated herpes-zoster (Shingles)

Think "MTV"

**Airborne precaution is no longer needed when all lesions have crusted over.*

DROPLET

- Private room or a client whose body cultures contain the same organism
- Wear a surgical mask
- Place a mask on the client whenever they leave the room

- **Adenovirus**
- **Diphtheria (pharyngeal)**
- **Epiglottitis**
- **Influenza (flu)**
- **Meningitis**
- **Mumps**
- **Parvovirus B19**
- **Pertussis**
- **Pneumonia**
- **Rubella**
- **Scarlet fever**
- **Sepsis**
- **Streptococcal pharyngitis**

CONTACT

- Private room or cohort client
- Use gloves & a gown whenever entering the client's room

- **Colonization or infection with a multidrug-resistant organism**
- **Enteric infections** (Clostridium difficile)
- **Respiratory infections** (RSV, Influenza)
- **Wound & skin infections** (cutaneous diphtheria, herpes simplex, impetigo, pediculosis, scabies, staphylococci, & varicella-zoster)
- **Eye infections** (conjunctivitis)

IV THERAPY: TYPES OF IV SOLUTIONS

Fluid in our body is found in 2 places:

INTRACELLULAR & EXTRACELLULAR

INTRACELLULAR (ICF)

is Fluid INSIDE the cell

(Millions of these cells in our body)

EXTRACELLULAR (ECF)

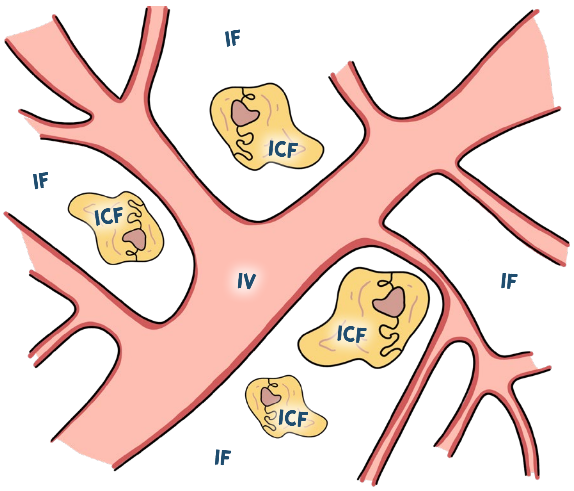
is Fluid OUTSIDE the cell

INTERSTITIAL (IF)

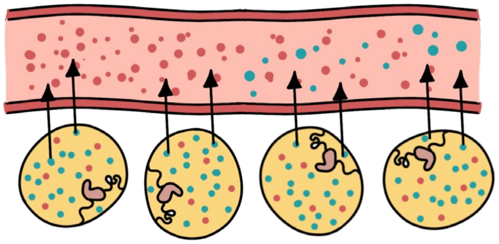
is fluid that surrounds the cell AKA fluid in the tissues

INTRAVASCULAR (IV)

is plasma in the blood vessels



HYPERTONIC "Enter the vessel from the cells"



More concentrated & ↑ osmolality

5% dextrose in 0.9% saline (D5NS)

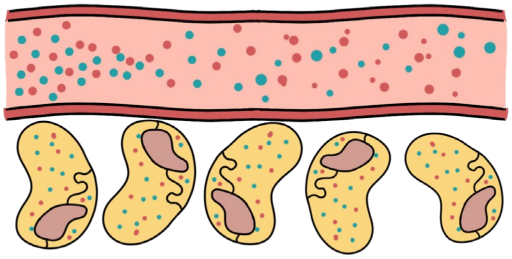
5% dextrose in 0.45% saline

5% dextrose in LR

USES

- **Cerebral Edema**
- **Low levels of sodium (hyponatremia)**
- **Metabolic alkalosis**
- **Maintenance fluid**
- **Hypovolemia**

ISOTONIC "Stays where I put it"



Same osmolality as body fluids
(ISO means Equal)
(Equal water & particle ratio)

0.9% saline (NS)

Used with BLOOD PRODUCTS

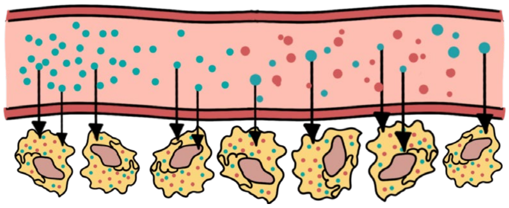
Lactated Ringers (LR)

5% dextrose (D5W)

USES

- **EXPANDS intravascular fluids volume & replaces the fluid loss associated with...**
  - Burns
  - Hemorrhage
  - Surgery
  - Dehydration
    - ➥ Vomiting & diarrhea
  - Also used for fluid maintenance

HYPOTONIC "Go Out of the vessel" & into the cell"



More diluted & ↓ osmolality
(less salt, more water)

Fluids goes Out of the vessel & into the cell making the cell SWELL!

"Water flows where sodium (particles) goes"

0.45% NS

2.5% Dextrose

0.33% NS

In DKA, there is so much glucose in the cells they need water!

USES

- **Intracellular dehydration such as DKA**
- **Never give to clients with burns or liver disease**
- **Helps kidneys excrete excess fluids**

IV THERAPY: COMPLICATIONS

AIR EMBOLISM

Air enters the vein through the IV tubing

SYMPTOMS

- Tachycardia
- Chest pain
- Hypotension
- ↓ LOC
- Cyanosis

TREATMENT

- Clamp the tubing
- Turn client on the left side & place in Trendelenburg position
- Notify the HCP

INFILTRATION

IV fluid leaks into surrounding tissue

SYMPTOMS

- At the site...
    - ➥ Pain
    - ➥ Swelling
    - ➥ Coolness
    - ➥ Numbness
- No blood return

TREATMENT

- Remove the IV
- Elevate the extremity
- Apply a warm or cool compress
- Do not rub the area

INFECTION

Entry of microorganism into the body via IV

SYMPTOMS

- Tachycardia
- Redness
- Swelling
- Chills & Fever
- Malaise
- Nausea & vomiting

TREATMENT

- Remove the IV
- Obtain cultures
- Possible antibiotics administration

CIRCULATORY OVERLOAD

Administration of fluids too rapidly (Fluid Volume Overload)

SYMPTOMS

- ↑ blood pressure
- Distended neck veins
- Dyspnea
- Wet cough & crackles

TREATMENT

- ↓ flow rate (keep-vein-open rate)
- Elevate the head of the bed
- Keep the client warm
- Notify the HCP

PHLEBITIS

Inflammation of the vein
Can lead to a clot (thrombophlebitis)

SYMPTOMS

- At the site
    - ➥ Heat
    - ➥ Redness
    - ➥ Tenderness
- ↓ Flow of IV

TREATMENT

- Remove the IV
- Notify the HCP
- Restart the IV on the opposite side

HEMATOMA

Collection of blood in the tissues

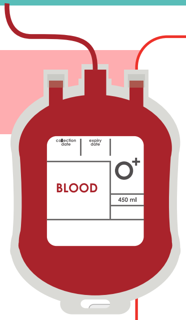
SYMPTOMS

- Ecchymosis
- At the site
    - ➥ Blood
    - ➥ Hard & painful lump

TREATMENT

- **ELEVATE** the extremity
- Apply Pressure & Ice

BLOOD TRANSFUSIONS



ADMINISTRATION OF THE TRANSFUSION

1. Insert an IV line using an 18- or 19-gauge IV needle
2. Run it with normal saline (keep-vein-open-rate)
3. Use the largest catheter port available
4. Begin the transfusion slowly
    - A. The first 15 min *MOST CRITICAL* monitor the client for S/S of any transfusion reaction
    - B. Vital signs are monitored every 30 minutes - 1 hour
    - C. After 15 minutes the flow can be increased (unless a transfusion reaction has occurred)
5. Document the client's tolerance to the administration of the blood product

FACTS ABOUT BLOOD TRANSFUSION

- Administered by the RN
- Only Normal Saline (NS) can be used in conjunction with blood
- Type & screen and a cross match are good for 72 hours
- 30 minutes - from the time you received it from the blood bank to the time you infuse
- 4 hours - All blood must be transfused
- STOP the transfusion if you suspect a transfusion reaction

TRANSFUSION REACTION

A transfusion reaction is an adverse reaction that happens as a result of receiving blood transfusions

IMMEDIATE TRANSFUSION REACTION

Chills, diaphoresis, aches, chest pain, rash, hives, itching, swelling, dyspnea, cough, wheezing, or rapid, thready pulse

CIRCULATORY OVERLOAD

Infusion of blood too rapid for the client to tolerate
Cough, dyspnea, chest pain, headache, hypertension, tachycardia, bounding pulse, distended neck vein, wheezing

SEPTICEMIA

Blood that is contaminated with microorganisms
Rapid onset of chills, high fever, vomiting, diarrhea, hypotension & shock

IRON OVERLOAD

Complication that occurs in client's who receive multiple blood transfusions
Vomiting, diarrhea, hypotension, altered hematological values

SIGNS OF TRANSFUSION REACTIONS

- Fast heart Rate
- Itching/urticaria/skin rash
- Wheezing/dyspnea/tachypnea
- Anxiety
- Flushing / fever
- Back pain

NURSING ACTIONS TO A TRANSFUSION REACTION

1. *STOP* the transfusion
2. Change the IV tubing down to the IV site
3. Keep the IV open w/ normal saline
4. Notify the HCP & blood bank
5. Do not leave the client alone (monitor the client's vital signs & continue to assess the client)

PHARMACOKINETICS

"ADME"

A ABSORPTION

Medication going from the location of administration to the bloodstream

ORAL	Subcut & IM	IV
Takes the longest to absorb	Depends on the site of blood perfusion. More blood perfusion = rapid absorption	Quickest absorption time

D DISTRIBUTION

Transportation by bodily fluids of the medication to where it needs to go

Influencing factors:

- Circulation
- Permeability of the cell membrane
- Plasma protein binding

M METABOLISM

How is the medication going to be broken down?

Most common site: **LIVER**

Influencing factors:

- Age
  (Infants & elderly have a limited med-metabolizing capacity)
- Medication type
- First-pass effect
  Liver may inactivate some medication (may need non enteral route)
- Nutritional status

E EXCRETION

How is the medication going to be eliminated from the body?

Most commonly done by **KIDNEYS**

Influencing factors:

- Kidney dysfunction
  Leads to an increase in the duration and intensity of a medication response

MEDICATION ADMINISTRATION

6 RIGHTS OF MED ADMIN

- RIGHT **CLIENT**
- RIGHT **MED**
- RIGHT **TIME**
- RIGHT **ROUTE**
- RIGHT **DOSE**
- RIGHT **DOCUMENTATION**

TYPES OF ORDERS

→ ROUTINE

Given on a regular schedule with or without a termination date

→ SINGLE "ONE-TIME"

Given on a regular schedule with or without a termination date

→ STAT

Only for administration once and given immediately

→ PRN

"As needed" must have an indication for use such as pain, nausea & vomiting.

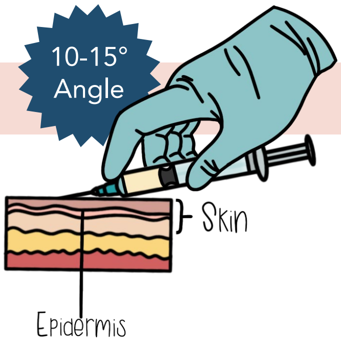
COMMON MEDICATION ERRORS

! Medication error kills, prevention is crucial!

- **Wrong medication**
- **Incorrect dose**
- **Wrong...**
    - ➥ Client
    - ➥ Route
    - ➥ Time
- **Administer a medication the client is allergic to**
- **Incorrect D/C of Medication**
- **Inaccurate prescribing**

PARENTERAL ADMINISTRATION

Any route of administration that does not involve drug absorption through the GI tract



INTRADERMAL (ID)

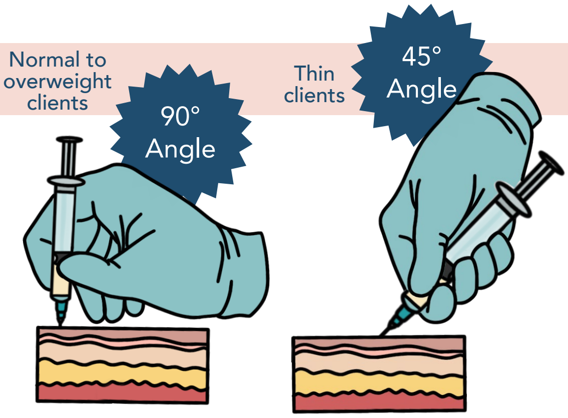
USES:
- TB testing
- Allergy sensitivities

NEEDLE SIZE: 25 - 27 gauge

NEEDLE LENGTH: 1.4 - 5/8 in (0.6 - 1.6 cm)

USUAL SITE: Inner forearm

Should form a "BLEB"



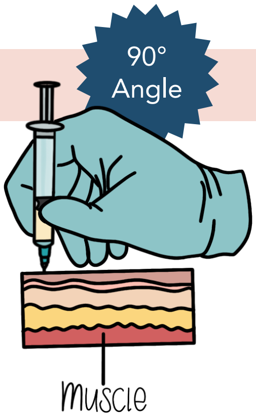
SUBCUTANEOUS (SUBCUT)

USES: non-irritating, water-soluble medication (insulin & heparin)

NEEDLE SIZE: 25 - 27 gauge

NEEDLE LENGTH: 3/8 - 5/8 in (1.0 - 1.6 cm)

USUAL SITE: Abdomen, posterior upper arm, thigh



INTRAMUSCULAR (IM)

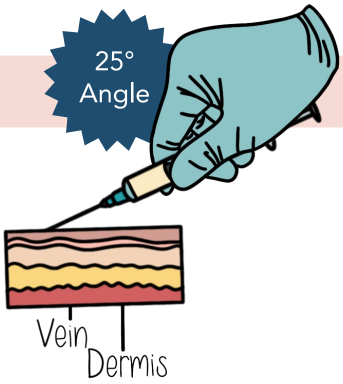
USES: Irritating, solutions in oils, and aqueous suspensions

NEEDLE SIZE: 18 - 25 gauge

USUAL SITE: Deltoid, vastus lateralis, ventrogluteal

→ **Do not inject more than 3 mL (2 mL for the deltoid)**
- Divide larger volumes into two syringes & use two different sites

→ **Use the Z-track method**



INTRAVENOUS (IV)

USES: Administering medications, fluids, & blood products

NEEDLE SIZE:
16-gauge: clients who have trauma
18-gauge: surgery & blood administration
22 - 24-gauge: children, older adults, & clients who have medical issues or are stable post-op

USUAL SITE: Hand, wrist, cubital fossa, foot, scalp

The *smaller* the gauge, the *larger* the IV bore.
EXAMPLE:
16 gauge is the largest needle size

NONPARENTERAL ADMINISTRATION

Absorbed into the system through the digestive tract

ORAL OR ENTERAL

- CONTRAINDICATIONS: vomiting, aspiration precautions/absence of a gag reflex, decreased LOC, difficulty swallowing
- Have client sit at 90 angle to help with swallowing
- NEVER crush enteric-coated or time-release medications
- Break or cut scored tablets only!

TRANSDERMAL

- Place the patch on a dry and clean area of skin (free of hair)
- Rotate the sites of the patch to prevent skin irritation
- Always take off the old patch before placing a new one on

INHALATION

- Rinse mouth after the use of steroids
- 20 - 30 seconds between puffs
- 2 - 5 minutes between different medications
- Use a spacer if possible to prevent thrush

SUBLINGUAL & BUCCAL

SUBLINGUAL: Under the tongue

BUCCAL: Between the cheek & the gum

- Keep the tablet in place until it has completely absorbed
- DO NOT eat or drink until the tablet has completely dissolved

SUPPOSITORIES

RECTAL

- Lateral or sims' position
- Use lubrication
- Insert beyond the internal sphincter
- Leave it in for 5 minutes

VAGINAL

- Supine with knees bent & feet flat on the bed, close to hips
- Insert the suppository along the posterior wall of the vagina (3 - 4 inches deep)
- Stay supine for at least 5 minutes

INSTALLATION (DROPS, OINTMENTS, SPRAYS)

EYES

- If there is dried section use a moisten sterile gauze and wipe from inner to outer canthus to prevent bacterial from entering the eye
- Have the client tilt their head back slightly
- Pull lower eye lid down gently to expose the conjunctival sac
- Hold the dropper 1-2cm above the conjunctiva sac & drop medication directly into the sac
- Close eye lid & apply gentle pressure on the nasolacrimal duct for 30 - 60 seconds

EARS

- Have client tilt their head
- Warm the solution before adm. to prevent vertigo & dizziness
- Adults: pull ear upward & outward
- < 3 years of age: pull ear down & back

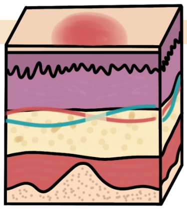
NOSE

- Have client lie supine
- Do not blow nose for 5 min after drop instillation

PRESSURE INJURIES (ULCERS)
"DECUBITUS ULCER" "BED SORES"

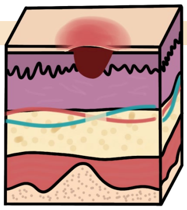
WHAT IS A PRESSURE ULCER?

The break down of skin integrity due to unrelieved pressure



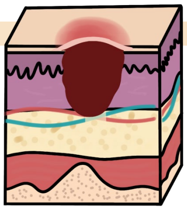
TYPE 1

- Skin is intact (unbroken)
- Nonblanchable redness
- Swollen tissue
- Darker skin → may appear blue / purple



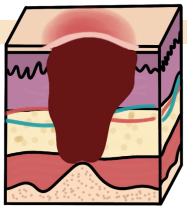
TYPE 2

- Partial thickness
- Epidermis & the dermis
    - ➥ No fatty tissue is visible
- Superficial ulcer
- Abrasion or ulcer



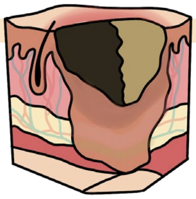
TYPE 3

- Full thickness SKIN loss
    - ➥ Damage to or necrosis of subcut tissue
    - ➥ No exposed muslce or bone
- Ulcer extend down to the underlying fascia, but not through it
- Deep crater with or without tunneling



TYPE 4

- Full thickness TISSUE loss
    - ➥ Destruction of tissue
    - ➥ Damage to muscle & bone
- Deep pockets of infection & tunneling



UNSTAGEABLE

When the stage cannot be determined due to ESCHAR or SLOUGH covering the visibility of the wound making the depth unknown.

BRADEN SCALE

Asses your client's skin **EVERY** shift for pressure injuries using the Braden Scale!

Looks at 6 categories

- → **SENSORY PERCEPTION**
- → **MOISTURE**
- → **ACTIVITY**
- → **MOBILITY**
- → **NUTRITION**
- → **FRICTION & SHEAR**

Interpretation

- → **LOW RISK: 22 - 23**
- → **LESS RISK: 19 - 21**
- → **HIGH RISK: <18**

RISK FACTORS

" AVOIDS PRESS "

AGING SKIN
VASCULAR DISORDERS
OBESITY
IMMOBILITY & INCONTINENCE
DIABETES
SKIN FRICTION

POOR NUTRITION
REDUCED RBC'S (ANEMIA)
EDEMA
SENSORY DEFICITS
SEDATION

PREVENTION

RELIEVE PRESSURE

- → Apply pressure relieving devices (overlays, speciality beds, air cushions, foam-padded seat cushions, etc.)
- → Do not use donut-type devices or synthetic sheepskins!

PROPER NUTRION

- → ↑ protein intake
- → Adequte hydration
- → Possible enteral nutrition

SKIN HYGIENE

- → Clean skin with mild soap
- → Clean incontinent clients

- → Do not scrub or rub bony prominences
- → Barrier for incontinence
- → Moisturizer for hydration

REPOSITIONING

- → Turn/reposition your client every 2 hours while in the bed
- → Lift, do not PULL
    - ▪ Pulling could cause shearing & friction from force

HYPOVOLEMIA VS. HYPERVOLEMIA

HYPOVOLEMIA

HYPO ↓ "LOW"

VOLEMIA ↓ "VOLUME"

Dehydration ● Fluid volume deficit (FVD) ● Hypovolemic shock!

CAUSES

- Loss of fluid from ANYWHERE
  - Thoracentesis
  - Paracentesis
  - Hemorrhage
  - NG tube
  - Trauma
  - GI loses
    - Vomiting
    - Diarrhea
- Third spacing
  - Burns
  - Ascites
- Polyuria (peeing a lot)
  - Diabetes
  - Diuretics
  - Diabetes insipidus

Third spacing shifts the fluids from the **INTRAVASCULAR SPACE** (the vein) into the **INTERSTITIAL SPACE** (the cells).

This causes a drop in the circulating blood volume

SIGNS & SYMPTOMS

- Flat neck veins
- ↑ HR (weak & thready)
- ↑ Respirations
- ↑ Urine specific gravity
- ↓ BP
- ↓ CVP
- ↓ Weight
- ↓ Skin turgor
- ↓ Urine output
- Dry mucous membranes
- Thirst

LESS VOLUME = LESS PRESSURE

LABS

CONCENTRATED (DEHYDRATED) MAKES THE # GO UP

- ↑ Urine specific gravity
- ↑ Hematocrit (%)
- ↑ Serum sodium
- ↑ BUN

NURSING CONSIDERATIONS / TREATMENT

- Fluid replacement
  - Fluids (PO or IV)
  - Monitor for fluid volume overload with fluid admin.
- Safety precautions
  - Risk for fall due to orthostatic hypotension
- Daily I&O + weights

HYPERVOLEMIA

HYPER ↓ "HIGH"

VOLEMIA ↓ "VOLUME"

Over-hydration ● Fluid volume excess

CAUSES

- Heart failure
- Kidney dysfunction
  - Can't filter the blood = back up of fluids
- Cirrhosis
- ↑ Sodium intake
  - Where sodium goes, water flows!

SIGNS & SYMPTOMS

- Distended neck vein (JVD)
- ↑ HR (bounding)
- ↑ BP
- ↑ Weight
- ↑ CVP
- Edema
- Wet lung sound
  - Crackles / dyspnea
  - Due to back flow of fluid from the heart
- Polyuria
  - Kidneys are trying to get rid of the excess fluid

MORE VOLUME = MORE PRESSURE

LABS

DILUTED (OVER-HYDRATED) MAKES THE # GO DOWN

- ↓ Urine specific gravity
- ↓ Hematocrit (%)
- ↓ Serum sodium
- ↓ BUN

NURSING CONSIDERATIONS / TREATMENT

- Low sodium diet
  - Where sodium goes, water flows!
- Daily I&O + weights
- Diuretics
- High-Fowler's or Semi-Fowler's position
  - Easier to breathe

SCOPE OF PRACTICE

RN

- Post-op assessment
- Initial client teaching
- Starting blood products
- Sterile procedures
- IV's & IV medications
- Discharge education
- Clinical assessment

ADPIE

NOTE:

When a registered nurse delegates tasks to others, responsibility is transferred but accountability for patient care is not transferred. The RN is still responsible!

LPN/LVN

- Stable client
- Monitor RN's findings & gather data
- Specific assessments
- Reinforce teaching
- Routine procedures (catheterization, ostomy care, wound care)
- Monitors IVF's & blood products
- Administer injections & narcotics (not IV's meds & 1st IV bag)
- Tube potency & enteral feedings
- Sterile procedures

SPECIFIC ASSESSMENTS

Lung sounds, bowel sounds, & neurovascular checks

UAP

- Routine, stable vital signs
- Documenting input and output
- Can get blood from the blood bank
- Activities of daily living (ADL's)

ADL'S

- Feeding (not with aspiration risk)
- Positioning
- Ambulation
- Cleaning
- Linen change
- Hygiene care

RN = Registered Nurse, LPN = Licensed Practical Nurse, LVN = Licensed Vocational Nurse, UAP = Unlicensed Assistive Personnel

MENTAL HEALTH DISORDERS

THERAPEUTIC COMMUNICATION TECHNIQUES

Client-centered type of communication to build and help relationships with clients, families, and all relationships.

✓ DO

- Allow client to control the discussion
- Give recognition/validation
- Active listening!
- Use open-ended questions

Don't be a **LOSER**, be an active listener!

L Lean forward toward the client
O Open posture
S Sit squarely facing the client
E Establish eye contact
R Relax & listen

EXAMPLES

"Is there something you would like to talk about?"

"Tell me more about that"

"So you are saying you haven't been sleeping well?"

"Tell me more about ______"

✗ DON'T

- Ask "why"
- Ask too many questions
- Give advice
- Give false reassurance
- Change the conversation topic
- Give approval or disapproval
- Use close-ended questions/statements

EXAMPLES

"Don't worry!"

"I think you should _____"

"Don't be silly"

"That's great!"

THERAPEUTIC COMMUNICATION CAN BE BOTH...

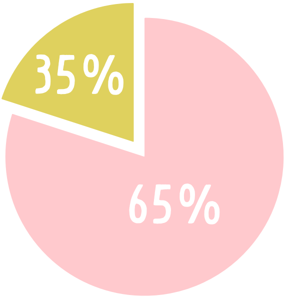
VERBAL COMMUNICATIONS

&

NON-VERBAL COMMUNICATIONS

Words a person speaks

You may say all the "right" things but deliver it poorly.



Facial expressions
Eye contact
Posture
Movement
Appearance
Body language
Vocal cues
(yawning, tone of voice, pitch of voice)

PERSONALITY DISORDERS

CLUSTER A

Odd or Eccentric

PARANOID

- Suspicious of others
- Thinks everyone wants to harm them

SCHIZOID

- Indifferent
- Seclusive
- Detached
- Doesn't care for close relationships

SCHIZOTYPAL

- Odd thinking (magical thinking)
- Strange appearance

CLUSTER B

Dramatic or Emotional

ANTISOCIAL

- No care for others
- Aggressive
- Manipulative
- Doesn't follow the rules

BORDERLINE

- Unstable
- Manipulative to self & others
- Fear of neglect

HISTRIONIC

- Seeks attention
- Center of attention by being seductive & flirtatious

NARCISSTIC

- Egocentric AKA narcissus
- Needs consistent applause

CLUSTER C

Anxious or Insecure

AVOIDANT

- Anxious in social settings
- Avoids social interactions but desires close relationships
- Fear of abandonment

DEPENDENT

- Extreme dependency on someone
- Searches urgently to find a new relationship when the other fails

OBSESSIVE-COMPULSIVE

- Perfectionist
- Control issue
- Rigid

NURSING CARE

- Safety is a priority

Clients with a personality disorder are at a ↑ risk for violence & self-harm

- Develop a therapeutic relationship
- Respect the client's needs while still setting limits and consistency
- Give the client choices to improve their feeling of control

TREATMENT

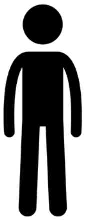
Medications such as

- Antidepressants
- Anxiolytics
- Antipsychotics
- Mood stabilizers

Therapies such as

- Psycho
- Group
- Cognitive
- Behavioral

EATING DISORDERS



ANOREXIA NERVOSA

↓ Weight (BMI <18.5)

↓ Blood pressure

↓ Heart rate — *from dehydration & electrolyte imbalance*

↓ Sexual development

↓ Subcutaneous tissue = Hypothermia

↓ Period regularity

Amenorrhea *(period may stop)*

Refuses to eat

Lanugo *(thin hair to keep the body warm)*

Typically does not purge

Restricts self from eating

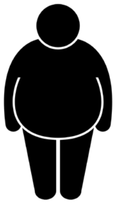
Fear of gaining weight

Constipation *(from dehydration)*

TREATMENT

↑ Weight slowly
(2 -3 lbs a week)

Monitor excerise



BULIMIA NERVOSA

Binge eating followed by purging

Normal weight to overweight
(BMI 18.5 - 30)

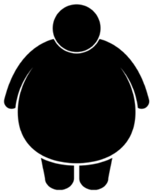
Teeth erosion

Bad breath

May use laxatives and/or diuretics

TREATMENT

Monitor client during and
after meals
for acts of purging



BINGE EATING

Binge eating not followed by purging

Tend to be overweight

Binging causes:
- Depression
- Hatred
- Shame

REFEEDING SYNDROME

Potential complications when fluids, electrolytes, and carbohydrates are introduced too quickly to a malnourished client. Treatment should be done **slowly** to avoid this syndrome.

TREATMENT FOR ALL EATING DISORDERS

Teach
coping skills

Maintain
trust

Have the client be a part
of the decision making
& the plan of care!

Therapy
group, individual or family

BIPOLAR DISORDER

MOOD SWINGS:

Depression to mania with periods of normalcy

SWINGS FROM

MANIC PHASE

Periods of **HIGH** mood
Irritable & hyper
May require hospitalization

SIGNS & SYMPTOMS

Restless

Flight of ideas
Conversation is all over the place with rapid speech

Grandiosity

Hyper mood
Leads to exhaustion

Poor judgement

Manipulative behavior

↓ Sleep

Delusions

Hallucinations

Impulsivity
Examples: maxing out credit cards, engaging in risky behavior

Elevated activity
Leads to malnutrition & dehydration

DEPRESSIVE PHASE

Periods of **LOW** mood

SIGNS & SYMPTOMS

Sad

Low energy levels

Sleep disturbances:
too much or too little sleep

For clients with mania, the nurse should offer energy & protein-dense foods that are easily consumed on the go (finger foods!)

HAMBURGERS • SANDWICHES
FRUIT JUICES • GRANOLA BARS • SHAKES

TREATMENT

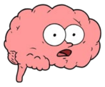
NURSING CONSIDERATIONS FOR THE ACUTE PHASE	• **Provide a safe environment** *Remove harmful objects from the room* • **Set limits on manipulative behavior** • **Provide finger foods & fluids** • **Re-channel energy for physical activity** • **↓ Stimuli** *– Turn off or turn down the TV & music* *– Keep away from other clients if they are bothersome*
PHARMACOLOGY	• **Lithium carbonate** • **Anticonvulsants** • **Antidepressants** • **Antipsychotics** • **Antianxiety** *See pharmacology section for more details*

SCHIZOPHRENIA SPECTRUM DISORDER OVERVIEW

PHASES

1	PRE-MORBID	Normal functioning. Symptoms have not become apparent yet.
2	PRODROMAL	More tempered form of the disorder. Can be months to years for the disorder to become obvious.
3	SCHIZOPHRENIA	Positive symptoms are noticeable and apparent.
4	RESIDUAL	Periods of remission. Negative symptoms may remain, but S&S of the acute stage (positive symptoms) are gone.

POSSIBLE CAUSES (not fully known)



↑ in the neurotransmitter DOPAMINE

Illicit substance
(LSD & Marijuana)

Environmental
(malnutrition, toxins, viruses during pregnancy)

Genetics
(family history)

SIGNS & SYMPTOMS

POSITIVE

Delusions

Anxiety/agitation

Hallucinations

Auditory **most common*

Jumbled speech

Disorganized behavior

NEGATIVE

Flattened/bland effect

Lack of energy

Reduced speech

Avolition
Lack of motivation

Anhedonia
Not capable of feeling joy or pleasure

Lack of social interaction

TREATMENT

- **Medication**
  - Antipsychotic medications
  - Antidepressants
  - Mood stabilizers (lithium)
  - Benzodiazepines
- **Therapy**
- **Exercise**

NURSING CONSIDERATIONS

- Try to establish trust with the client
- Encourage compliance with the medications
- Promote self-care
- Encourage group activities
- Offer therapeutic communication

HOW TO ADDRESS HALLUCINATIONS?

- Don't address the hallucinations
  Example: "I don't see spiders on the wall but I see you are scared"
- Be compassionate
- Bring the conversation back to reality
- Do not argue with the client
- Provide safety for the client & the staff!

TYPES OF DEPRESSION

MAJOR DEPRESSIVE DISORDER (MDD)

Has at least 5 of these symptoms every day for at least 2 weeks:

- Depressed mood
- Too much or too little sleep
- Indecisiveness
- Thoughts of death (suicide)
- ↓ ability to think/concentrate
- Not able to feel pleasure
- ↑ or ↓ motor activity
- Weight fluctuations
  (5% change within a month)

FACTS

- MDD impairs the client's normal functioning
- MDD is not the same depression seen in bipolar disorder
- MDD is not a mood swing, it's constant

TREATMENT PHASES FOR MDD

ACUTE: 6 - 12 weeks
Hospitalization & medications may be perscribed
GOALS:
- ↓ Depressive symptoms
- ↑ Functionality

CONTINUATION: 4 - 9 months-
Medication is continued
GOALS:
- Prevent relapse

MAINTENANCE: 1+ year
Medication may be continued or be phased out
GOALS:
- Prevent relapse & further depressive episodes

Treatment for the client will reflect what phase they are in!

PREMENSTRUAL DYSPHORIC DISORDER (PMDD)

Depression that occurs during the luteal phase of the menstrual cycle.

SYMPTOMS

- Emotional
- ↑ Eating
- ↓ Energy
- ↓ Concentration

SUBSTANCE INDUCED DEPRESSIVE DISORDER

Depression associated with withdrawal or the use of alcohol and drugs.

PERSISTENT DEPRESSIVE DISORDER (DYSTHYMIA)

A more mild form of depression compared to MDD, although it can turn into MDD later in life.

SEASONAL AFFECTIVE DISORDER (SAD)

Depression that occurs seasonally.
Often occurs during the winter months when there is less sunshine.

TREATMENT: Light therapy

POSTPARTUM

Depression that happens after a woman goes through childbirth. The woman may feel disconnected from the world. She may have a fear of harming her newborn.

NURSING CONSIDERATIONS

- Safety is a priority. Those struggling with depression have a higher suicide risk.
  Initiate suicide precautions:
  - Remove sharp things
  - Keep medications out of reach
  - Remove objects that may be used for strangulation (wires)
- Help the client identify coping methods & teach alternatives if needed
- Provide local resources such as churches, local programs, community resources, etc.
- Encourage:
  - Physical activity
  - Self-care
  - Supportive relationships
  Individual therapy, support groups, & peer support

TREATMENT

MEDICATIONS

- SSRI's
- SNRI's
- TCA's
- MAOI's

NON-PHARMACOLOGICAL THERAPIES

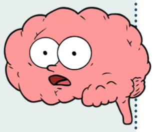
- Light therapy
- St. John's wort

ELECTROCONVULSIVE THERAPY (ECT)

Used for clients who are unresponsive to other treatments.
Transmits a brief electrical stimulation to the patient's brain.

THE PROCEDURE

- The client is asleep under anesthesia
- The client will not remember and is unaware of the procedure
- Muscle relaxants may be given to ↓ seizure activity & ↓ risk for injury
- Client may have memory loss, confusion, & headache post-procedure



DIFFERENT TYPES OF ANXIETY DISORDERS

NORMAL → **WORST**

	MILD	MODERATE	SEVERE	PANIC
LEVELS OF ANXIETY	Normal/healthy amount of anxiety. Allows one to have sharp focus & problem solve.	Thinking ability is impaired. Sharp focus & problem-solving can still happen just at a lower level.	Focus & problem solving are not possible. Feelings of doom may be felt.	Most extreme anxiety. Unstable & not in touch with reality.
SYMPTOMS	Nail-biting Tapping Foot jitters	GI upset Headache Voice is shaky	Dizziness Headache Nausea Sleeplessness Hyperventilation	Pacing Yelling Running Hallucinations

ANXIETY DISORDERS	Separation Anxiety Disorder	Experiences extreme fear of anxiety when separated from someone they are emotionally connected to. This is a normal part of infancy, but not a normal part of adulthood.
	Specific Phobia	Irrational fear of a particular object or situation. **SOME EXAMPLES:** • Monophobia - *Fear of being alone* • Zoophobia - *Fear of animals* • Acrophobia - *Fear of heights*
	Social Anxiety Disorder (Social Phobia)	Fear of social situations or presenting in front of groups. They fear embarrassment. They may have symptoms (real or fake) to escape the situation.
	Panic Disorder	Reoccurring panic attacks that last 15 - 30 minutes with physical manifestations.
	Agoraphobia	Extreme fear of certain places where the client feels unsafe or defenseless. May even be too fearful of places to maintain employment. Agora means "open space"
	Generalized Anxiety Disorder (GAD)	Uncontrolled extreme worry for at least **6** months that causes impairment of functionality.

OBSESSIVE COMPULSIVE DISORDERS	Obsessive Compulsive Disorder (OCD)	**OBSESSION:** Recurrent thoughts **COMPULSION:** Recurrent acts or behaviors This obsessiveness is usually because it decreases stress & helps deal with anxiety.
	Hoarding Disorder	Compulsive desire to save items even if they have no value to the person. It may even lead to unsafe living environments.
	Body Dysmorphic Disorder	Preoccupied with perceived flaws or imperfections in physical appearance that the client thinks they have.

SOMATIC SYMPTOM & RELATED DISORDERS (SOMATOFORM DISORDERS)

SOMATIC SYMPTOM DISORDER

Somatization is psychological stress that presents through physical symptoms that can not be explained by any pathology or diagnosis.

NURSING CONSIDERATIONS

- SAFETY is a priority Asses for symptoms or thoughts of self-harm or suicide
- Understand the somatic symptoms are real to the client even though they are not real
- Help the client verbalize their feelings while limiting the amount of time talking about their somatic symptoms
- Assess coping mechanism & educate on alternative ways of coping

MANIFESTATIONS

- Consumed by physical manifestations to the point it disrupts daily life
- Seeks medical help from multiple places
- Remission & exacerbations
- Overmedicates with analgesic and antianxiety medications
- ↑ Stress = ↑ somatic symptoms

PHQ-15: PATIENT HEALTH QUESTIONNAIRE 15

An assessment tool used to identify 15 of the most common somatic symptoms

CONVERSION DISORDER

Sudden onset of neurological manifestations & physical symptoms without a known neurological diagnosis. It can be related to a psychological conflict/need beyond their conscious control.

NURSING CONSIDERATIONS

- Ensure SAFETY
- Gain trust & rapport with the client
- Assess coping mechanism & educate on alternative ways of coping
- Assess stress management methods
- Encourage therapy such as:
  - Individual therapies
  - Group therapies
  - Support groups

MANIFESTATIONS

MOTOR

Paralysis pseudoseizures

Pseudocyesis:
Signs & symptoms of pregnancy without the presence of a fetus AKA false pregnancy. This may be present in a client who desires to become pregnant

SENSORY

Blindness
Deafness
Sensations (burning/tingling)
Inability to smell/speak

MEDICATIONS

The client may be prescribed **antidepressants** or **anxiolytics**

POSTTRAUMATIC STRESS DISORDER (PTSD)

Mental health condition where exposure to a traumatic event has occured.

NURSING CONSIDERATIONS

- Teach relaxation techniques
- Teach ways to ↓ anxiety
- Support groups

MANIFESTATIONS

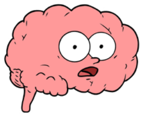
Lasting longer than 1 month:

- Anxiety
- Detachment
- Nightmares of the event

MEDICATIONS

Antidepressants may be prescribed

NEUROCOGNITIVE DISORDERS



Dementia & Alzheimer's are NOT the same.
Dementia is a general term that refers to a group of symptoms, not a specific disease.
Dementia may advance to a major neurocognitive disorder such as *Alzheimer's* disease.

DELIRIUM | ALZHEIMER'S

ONSET

DELIRIUM

SHORT TERM / SUDDEN CHANGE
Impairment (hours - days)

ALZHEIMER'S

CONTINUOUS
Decline of function (months - years)

RISK FACTORS

DELIRIUM

There is always an underlying cause... something is causing the delirium!

- Hospitalization
- ICU delirium
- Polypharmacy
- Old age
- Stroke
- Surgery
- Restraints
- Secondary to a medical condition (infection, electrolyte imbalance, substance abuse...etc)

ALZHEIMER'S

Genetics
Family history (immediate family)

Head Injury
Traumatic brain injuries (TBI) & head trauma

Advanced Age
>65 have the highest risk

Cardiovascular Disease & Lifestyle Factors
Inactivity, unhealthy diet, high cholesterol, obesity, & diabetes

MANIFESTATIONS

DELIRIUM

Delirium is a medical emergency and requires prompt diagnosis & treatment

- Disorganization
  - *Most common to time & place*
  - *Happens mostly at night*
- ↓ Memory
- Anxiety & agitation
- Delusional thinking
- Ranges from lethargic to hypervigilance!

ALZHEIMER'S

STAGES OF ALZHEIMER'S DISEASE

MILD	Early stage *not noticeable to others*	• Memory lapse • Misplacing things • Short term memory • Difficulty focusing • Can still accomplish own ADL's
MODERATE	Middle Stage *noticeable to others*	• Forgets own history • Difficulty completing tasks • Personality changes • Unable to do some ADL's & self-care (may be incontinent) • Gets lost & wanders often • Gets angry & frustrated
SEVERE	Late Stage *Requires full assistance*	• Needs assistant with all ADL's • Losing the capability to have discussions • Losing physical skills (walking, sitting, swallowing) • May result in death or coma

INTERVENTIONS

DELIRIUM

- Safety: prevent physical harm
- Avoid restrains when possible
- Remember physical needs (Hygiene, food, water, sleep, etc)
- May be prescribed anti-anxiety/antipsychotic medications

ALZHEIMER'S

Caring for a client with Alzheimer's is very complex!

- Help families in planning for extended care
- Monitor nutrition, weight, & fluids status
- Maintain a quiet environment to ↓ stimuli
- **Cholinesterase inhibitor** may be prescribed to improve quality of life but does NOT cure the disease.

Communication

- Speak slowly
- Give one direction at a time
- Don't ask complex or open-ended questions
- Ask simple, direct questions
- Face the client directly when speaking

RX

Used in early & moderate stages of dementia & Alzheimer's disease. May also be used for Parkinson's dementia.

GENERIC	TRADE NAME
donepezil	Aricept
galantamine	Razadyne
Rivastigmine	Exelon

CURE?

DELIRIUM

Reversible if prompt treatment is initiated

ALZHEIMER'S

Irreversible

MOTHER BABY

ABBREVIATIONS

IUP/IUFD	Intrauterine pregnancy / intrauterine fetal demise
SAB	Spontaneous abortion
TAB	Therapeutic abortion
LMP	Last menstrual period
ROM	Rupture of membranes
SROM	Spontaneous rupture of membranes
AROM	Artificial rupture of membranes
PROM	Prolonged rupture of membranes (>24 hours)
PPROM	Preterm premature rupture of membranes
SVD	Spontaneous vaginal delivery
FHR	Fetal heart rate
EFM	Electronic fetal monitoring
US	Ultrasound transducer (detects FHR)
FSE	Fetal scalp electrode (precise reading of FHR)
IUPC	Intrauterine pressure catheter (strength of contractions)
LTV	Long term variability
SVE	Sterile vaginal exam
MLE	Midline episiotomy

NST	Non-stress test
CST	Contraction stress test
BPP	Biophysical profile
VBAC	Vaginal birth after cesarean
AFI	Amniotic fluid index
BUFA	Baby up for adoption
NPNC	No prenatal care
PTL	Preterm labor
BOA	Born on arrival
BTL	Bilateral tubal ligation
D&C / D&E	Dilation & curettage / dilation & evacuation
LPNC	Late prenatal care
TIUP	Term intrauterine pregnancy
VMI / VFI	Viable male infant / viable female infant
EDB	Estimated date of birth
EDC	Estimated date of confinement
EDD	Estimated date of delivery

PREGNANCY DURATION

40 weeks gestational age

The number of completed weeks counting from the 1st day of the last normal menstrual cycle (LMP).

38 weeks fetal age

This refers to the age of the developing baby, counting from the estimated date of conception. The fetal age is usually 2 weeks less than the gestational age.

TRIMESTERS

First Trimester →	0 – 13 WEEKS
Second Trimester →	14 – 26 WEEKS
Third Trimester →	27 – 40 WEEKS

PRENATAL TERMS

Gravida / Gravidity

A woman who is pregnant / the number of pregnancies

Nulligravida	Primigravida	Multigravida
Never been pregnant	Pregnant for the first time	A woman who has had 2+ pregnancies

Parity

The number of pregnancies that have reach viability (20 weeks of gestation) whether the fetus was born alive or not

Nullipara	Primipara	Multipara
0 Zero pregnancies beyond viability (20 weeks)	1 One pregnancy that has reached viability (20 weeks)	2+ Two or more pregnancies that have reached viability (20 weeks)

Preterm

Pregnancies that have reached 20 weeks but ended before 37 weeks

Term

Pregnancies that have lasted between week 37 and week 42

Early Term:	37 – 38 6/7
Full Term:	39 – 40 6/7
Late Term:	41 – 41 6/7

Postdate/Postterm

A pregnancy that goes beyond 42 weeks

GTPAL

An acronym used to assess pregnancy outcomes

G **GRAVIDITY** → The number of pregnancies

- Includes the present pregnancy
- Includes miscarriages / abortions
- Twins / triplets count as one

T **TERM BIRTHS** → The number born at term

- > 37th week of gestation
- Includes alive or stillborn
- Twins / triplets count as one

P **PRE-TERM BIRTHS** → The number of pregnancies delivered beginning with the 20th – 36 6/7th weeks of gestation

- Includes alive or stillborn
- Twins / triplets count as one

A **ABORTIONS / MISCARRIAGES** → The number of pregnancies delivered before 20 weeks gestation

- Counts with gravidity
- Twins / triplets count as one

L **LIVING CHILDREN** → The number of current living children

- Twin / triplets count individually

ANSWER KEY
Q#1 is (D) 3-2-0-1-2
Q#2 is (C) 4-2-1-0-4

PRACTICE QUESTION 1

You are admitting a client to the mother-baby unit. Two hours ago she delivered a boy on her due date. She gives her obstetric history as follows: she has a three-year-old daughter who was delivered a week past her due date and last year she had a miscarriage at 8 weeks gestation. How would you note this history using the GTPAL system?

A. 2-2-1-0-2
B. 3-2-1-0-1
C. 3-2-1-0-2
[✓ **D**. 3-2-0-1-2]

GTPAL
3 2 0 1 2

PRACTICE QUESTION 2

A prenatal client's obstetric history indicates that she has been pregnant 3 times previously and that all her children from previous pregnancies are living. One was born at 39 weeks gestation, twins were born at 34 weeks gestation, & another child was born at 38 weeks gestation. She is currently 38 weeks pregnant. What is her gravidity & parity using the GTPAL system?

A. 4-1-3-0-4
B. 4-1-2-0-3
[✓ **C**. 4-2-1-0-4]
~~**D**~~. 4-2-2-0-4

GT PAL
4 2 1 0 4

PREGNANCY SIGNS & SYMPTOMS

PRESUMPTIVE

SUBJECTIVE

Think "Mom"

These are changes felt by the women that are subjective. Can be associated with other things.

NOT a definite diagnosis for pregnancy!

P Period Absent (Amenorrhea)
R Really tired
E Enlarged breasts
S Sore breasts
U Urination increased (urinary frequency)
M Movement perceived (quickening)
E Emesis & nausea

Why is quickening not a positive sign?

Quickening can be difficult to distinguish from peristalsis or gas so it can not be a positive sign.

PROBABLE

OBJECTIVE

Think "Doctor"

Pregnancy signs that the nurse or doctor can observe

P Positive (+) pregnancy test (high levels of the hormone: hCG)
R Returning of the fetus when uterus is pushed w/ fingers (ballottement)
O Objective
B Braxton hicks contractions
A A softened cervix (Goodell's sign)
B Bluish color of the vulva, vagina, or cervix (Chadwick's sign)
L Lower uterine segment soft (Hegar's sign)
E Enlarged uterus

Why is a positive pregnancy test not a positive sign?

High levels of hCG can be associate with other conditions such as certain medications or hydatidiform mole (molar pregnancy).

POSITIVE

OBJECTIVE

Think "Baby"

Can only be attributed to a fetus

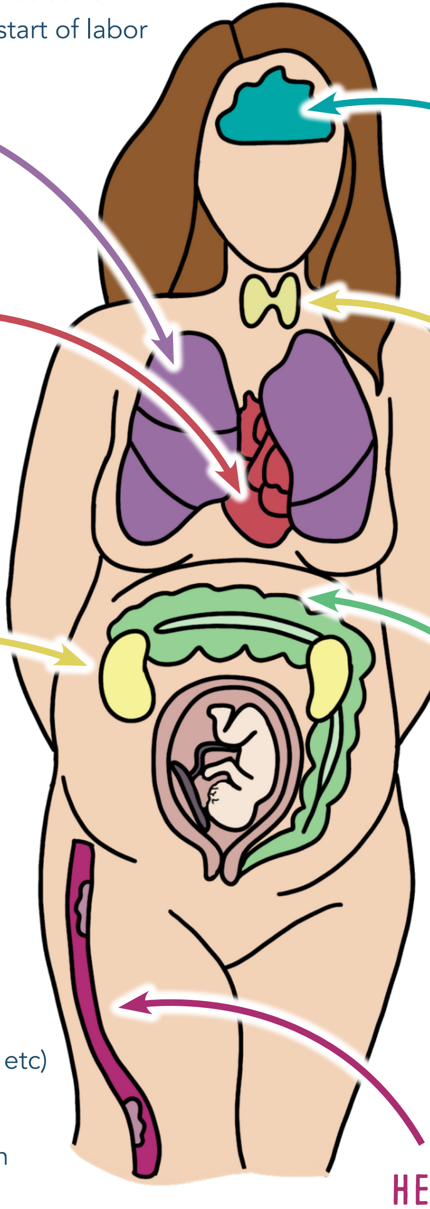
Definite diagnosis for pregnancy!

F Fetal movement palpated by a doctor or nurse
E Electronic device detects heart tones ♥
T The delivery of the baby
U Ultrasound detects baby
S Seeing visible movements

PREGNANCY PHYSIOLOGY

HORMONES

Prolactin: Allows for breast milk production
Estrogen: Growth of fetal organs & maternal tissues
Progesterone & Relaxin: Relaxes smooth muscles
hCG: Produced by placenta, prevents menstruation
Oxytocin: Stimulates contractions at the start of labor



RESPIRATORY

- ↑ Basal metabolic rate (BMR)
- ↑ O2 needs
- Respiratory alkalosis (MILD)

CARDIOVASCULAR

- ↑ Cardiac output
  (↑ Heart rate + ↑ stroke volume)
- Blood pressure stays the same or a slight decrease
- ↑ in plasma volume
- ❤ Enlarges
  (May develop systolic murmurs)

RENAL

- ↑ GFR from ↑ plasma volume
- Smooth muscle relaxation of the uterus = ↑ risk of UTI's!
- ↑ Urgency, frequency & nocturia
- EDEMA!!

SKIN

- **Striae**
  Stretch marks (abdomen, breasts, hips, etc)
- **Chloasma**
  Mask of pregnancy
  Brownish hyperpigmentation of the skin
- **Linea Nigra**
  "Pregnancy line" dark line that develops across your belly during pregnancy
- **Montgomery glands / Tubercles**
  Small rough / nodular / pimple-like appearance of the areola (nipple)

MUSCULOSKELETAL

- **Lordosis**: center of gravity shifts forward leading to inward curve of spine
- Low back pain
- Carpal tunnel syndrome
- Calf cramps

PITUITARY

- ↓ FSH/LH due to ↑ Progesterone
- ↑ Prolactin
- ↑ Oxytocin

THYROID

- ↑ Thyroxine
- May have moderate enlargement of the thyroid gland (goiter)
- ↑ Metabolism & ↑ appetite

GASTROINTESTINAL

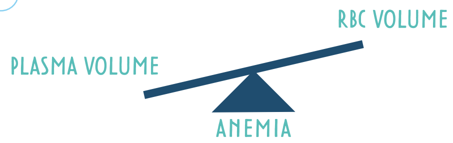
- **Pyrosis**
  ↑ Progesterone = LOS to relax = ↑ heartburn
- **Constipation & hemorrhoids**
  ↑ Progesterone = ↓ gut motility
- **Pica**
  Non-food cravings such as ice, clay, and laundry starch

HEMATOLOGICAL

FIBRINOGEN
- **Non-pregnant levels:** 200-400 mg/dL
- **Pregnant levels:** up to 600 mg/dL

Pregnant women are
HYPERCOAGULABLE
(increased risk for DVT's)

- ↑ White blood cells
- ↓ Platelets



ANEMIA

Plasma volume is greater than the amount of red blood cell (RBC) = hemodilution = **physiological anemia**

NAEGELE'S RULE

→ Used for estimating the expected date of delivery (EDD) based on LMP (last menstrual period)

DATE OF LAST MENSTRUAL PERIOD — 3 CALENDAR MONTHS + 7 DAYS + 1 YEAR

REMEMBER:

How many days
are in each month?
↓
30 days hath
September, April,
June & November.
All the rest have 31,
except February alone
(28 days)

EXAMPLE

1st day of last period: September 2, 2015
Minus 3 calendar months: June 2, 2015
Plus 7 days: June 9, 2015
Plus 1 year: June 9, 2016 → (EDD)

FACTS ABOUT NAEGELE'S RULE

- Bases calculation on a woman who has a 28-day cycle (most women vary)
- The typical gestation period is 280 days (40 weeks)
- First-time mothers usually have a slightly longer gestation period

WHAT TO AVOID DURING PREGNANCY

TERATOGENIC DRUGS

REMEMBER THE MNEMONIC!

TERA-TOWAS

T Thalidomide
E Epileptic medications (valproic acid, phenytoin)
R Retinoid (vit A)
A Ace inhibitors, ARBS
T Third element (lithium)
O Oral contraceptives
W Warfarin (coumadin)
A Alcohol
S Sulfonamides & sulfones

TORCH INFECTIONS

TORCH infections are a group of infections that cause fetal abnormalities. Pregnant women should avoid these infections!

REMEMBER THE MNEMONIC!

TORCH

T Toxoplasmosis
Parv **O** Virus-B19 (fifth disease)
R Rubella
C Cytomegalovirus
H Herpes simplex virus

STAGES OF LABOR

STAGE 1

CERVIX DILATES FROM 0-10 CM

Longest Stage

LATENT (EARLY)

- **Cervix dilates**: 1- 3 cm
- **Intensity**: Mild
- **Contractions**: 15 - 30 mins

ACTIVE

- **Cervix dilates**: 4 - 7 cm
- **Intensity**: Moderate
- **Contractions**: 3 -5 min (30-60 sec in duration)

TRANSITION

- **Cervix dilates**: 8 - 10 cm
- **Intensity**: Strong
- **Contractions**: Every 2-3 min (60-90 sec in duration)

INTERVENTIONS

- Promote comfort
  - Warm shower, massage, or epidural
- Offer fluids & ice chips
- Provide a quiet environment
- Encourage voiding every 1 - 2 hours
- Encourage participation in care & keep informed
- Instruct partner in **effleurage** (light stroking of the abdomen)
- Encourage effective breathing patterns & rest between contractions

REMEMBER THE MNEMONIC!

Labor
Actively
Transitioning

STAGE 2

THE BABY IS DELIVERED

→ Starts when cervix is fully dilated & effaced
→ Ends after the baby is delivered

PUSHING!!!

INTERVENTIONS

- Provide ice chips & ointment for dry lips
- Provide praise & encouragement to the mother
- Monitor uterine contractions & mothers vital signs
- Maintain privacy & encourage rest between contractions
- Encourage effective breathing patterns & rest between contractions
- Monitor for signs of birth (perineal bulging or visualization of fetal head)

STAGE 3

THE PLACENTA IS DELIVERED

>30 MIN = RETAINED PLACENTA

The PLACENTA is expelled (5 - 30 min after birth)

SIGNS OF A PLACENTA DELIVERY

- Lengthening umbilical cord
- Gush of blood
- Uterus changes from oval to globular shape

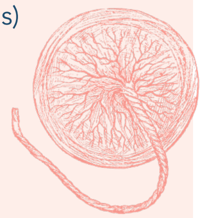
DELIVERY MECHANICS

"Shiny Schultz"
Side of *baby* delivered 1st

"Dirty Duncan"
Side of *mother* delivered 1st

INTERVENTIONS

- Assessing mothers vital signs
- Uterine status (fundal rubs every 15 minutes)
- Provide warmth to the mother
- Promote parental-neonatal attachment
- Examine placenta & verify it's intact
  - Should have 2 arteries & 1 vein



A A
V

TIP

Looks like smiley face!

2 "**A**" for Arteries
1 "**V**" for Vein

STAGE 4

RECOVERY!

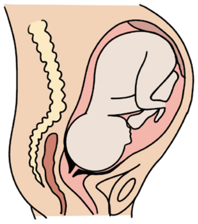
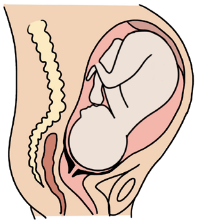
RECOVERY: first 1-4 hours after delivery of the placenta

- Assessing the fundus
- Continue to monitor vital signs & temperature for infection
- Administer IV fluids
- Monitor lochia discharge (lochia may be moderate in amount & red).
- Monitor for respiratory depression, vomiting, & aspiration if general anesthesia was used
- *Great time to watch for complications such as bleeding (postpartum hemorrhage)*

✓
- FIRM
- Midline

✗
- Soft
- Boggy
- Displaced

TRUE VS. FALSE LABOR

	FALSE LABOR	TRUE LABOR
CONTRACTIONS	• Irregular • Stops with walking / position change • Felt in the back or the abdomen above the umbilicus • Often stops with comfort measures	• Occur regularly ▪ Stronger ▪ Longer ▪ Closer together • More intense with walking • Felt in lower back → radiating to the **lower** portion of the abdomen • Continue despite the use of comfort measures
CERVIX	 • May be soft • NO significant change in.. ▪ Effacement ▪ Dilation • No bloody show • In posterior position (baby's head facing mom's front of belly)	 • Progressive change ▪ Softening ▪ Effacement ▪ Dilation signaled by the appearance of bloody show ▪ Moves to an increasingly anterior position (baby's head facing mom's back)
FETUS	• Presenting part is usually not engaged in the pelvis	• Presenting parts become engaged in the pelvis • Increased ease of breathing (more room to breathe) • Presenting part presses downward & compresses the bladder = urinary frequency

SIGNS OF LABOR

LABOR

Moving the fetus, placenta, & the membranes out of the uterus through the birth canal

Signs of Preceding Labor

- ☞ Lightening
- ☞ Increased vaginal discharge (bloody show)
- ☞ Return of urinary frequency
- ☞ Cervical ripening
- ☞ Rupture of membranes "water breaking"
- ☞ Persistent backache
- ☞ Stronger Braxton Hicks contractions
- ☞ Days preceding labor
  - Surge of energy
  - Weight loss (1- 3.5 pounds) from a fluid shift

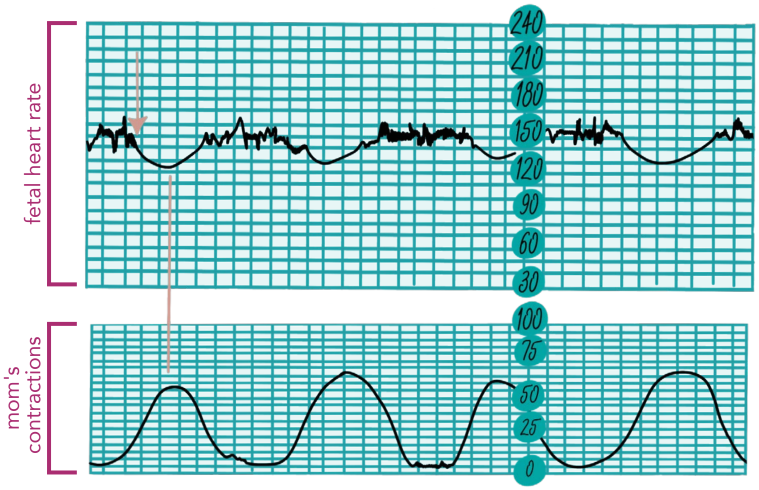
FETAL HEART TONES

Normal
fetal heart rate
120 - 160 BPM

EARLY DECELERATIONS

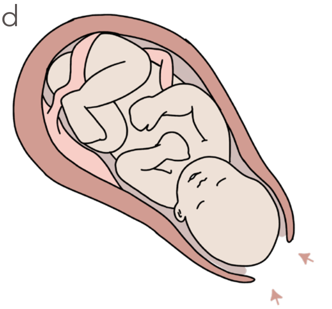
"Mirror" image of mom's contractions
(They don't technically come early)

NORMAL! ✓



Cause:
- From head compression

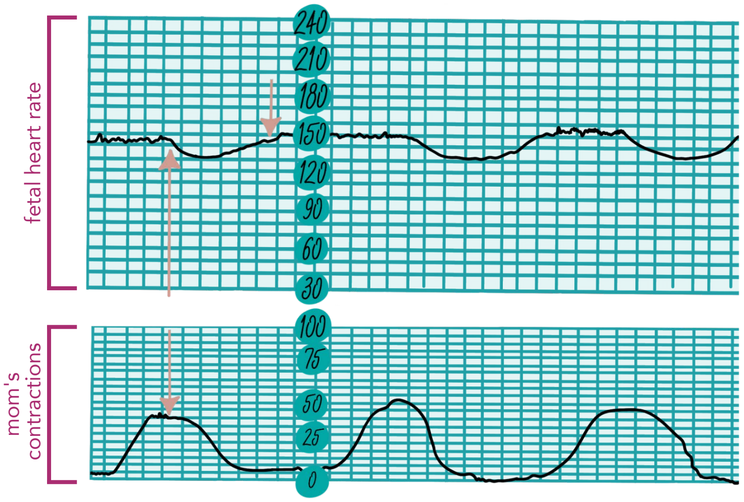
Intervention:
- Continue to monitor
- No intervention needed



LATE DECELERATIONS

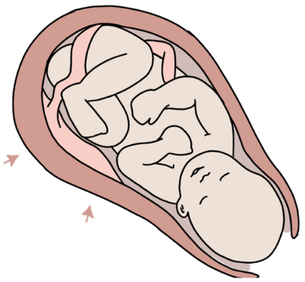
Literally comes late after mom's contraction

NON-REASSURING ✗



Cause:
- Uteroplacental insufficiency

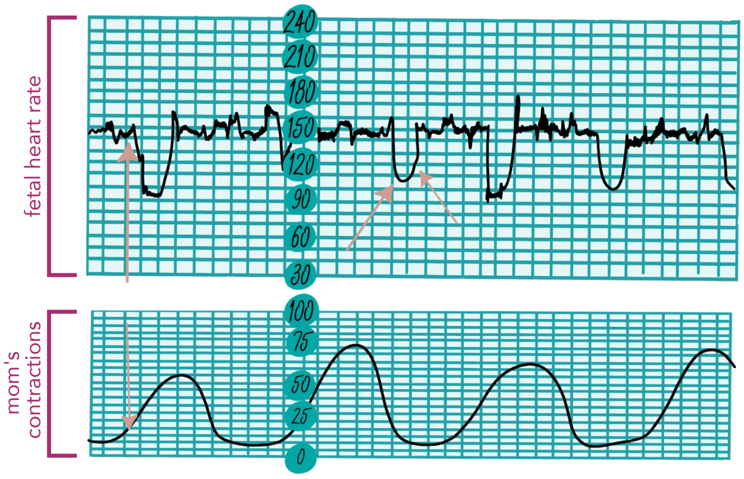
Intervention:
- D/C oxytocin
- Position change
- Oxygen (nonrebreather)
- Hydration (IV fluids)
- Elevate legs to correct the hypotension



VARIABLE DECELERATIONS

*Variable: Looks "V" shaped

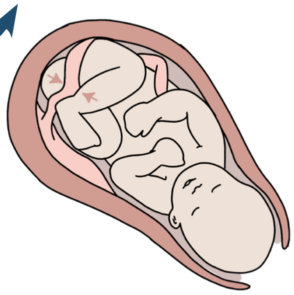
NON-REASSURING ✗



Cause:
- Cord compression

Intervention:
- D/C Oxytocin
- Amnioinfusion
- Position change
- Breathing techniques
- Oxygen (nonrebreather)

Side-lying or knee chest will relieve pressure on cord



PREECLAMPSIA OVERVIEW

Overview of Hypertensive disorders during pregnancy

1st Trimester | 20 WEEKS | **2nd Trimester** | **3rd Trimester**

CHRONIC HTN: Before pregnancy or before 20 weeks!

PREECLAMPSIA: HTN after 20 weeks gestation with systemic features

GESTATIONAL HTN: HTN after 20 weeks without systemic features

WHAT IS HYPERTENSION?

SYSTOLIC >140
OR
DIASTOLIC > 90

Hypertension may be abbreviated "HTN"

SIGNS & SYMPTOMS

"PRE" eclampsia

- **P** Proteinuria
- **R** Rising BP
- **E** Edema

Triad Signs

- Severe headache
- RUQ or epigastric pain
- Visual disturbances
- ↓ Urine output
- Hyperreflexia
- Rapid weight gain

PATHOLOGY

Pathology isn't completely known

PLACENTA
is the root cause

- Defective spiral artery remodeling
- Systemic vasoconstriction & endothelial dysfunction

RISK FACTORS

- HX of preeclampsia in previous pregnancies
- Family history of preeclampsia
- 1st pregnancy
- Obesity
- Very young (<18) or very old (>35)
- Medical conditions (Chronic HTN, renal disease, diabetes, autoimmune disease)

AMA (advanced maternal age)

HELLP SYNDROME

Variant of preeclampsia
Life-threatening complication

- **H** Hemolysis
- **EL** Elevated liver enzymes
- **LP** Low platelet count

ECLAMPSIA

(seizures activity or a coma)

Immediate care:

- Side-lying
- Padded side rails with pillows/blankets
- O2
- Suction if needed
- Do not restrain
- Do not leave

MAGNESIUM SULFATE

RX given to prevent seizures during & after labor.

***Remember**: magnesium acts like a depressant*

THERAPEUTIC RANGE: 4 – 7 mg/dL

TOXICITY!

- RR <12
- ↓ DTR's
- UOP <30 mL/hr
- EKG Changes

**Mag is excreted in urine*
↓UOP → ↑Mag levels

ANTIDOTE: calcium gluconate

*because magnesium sulfate can cause respiratory depression

VEAL CHOP

A tool to help interpret fetal strips

V Variability → C Cord Compression
E Early Decelerations → H Head Compression
A Accelerations → O OK (normal fetal oxygenation)
L Late Decelerations → P Placental Insufficiency

ASSESSMENT OF UTERINE CONTRACTIONS

Duration	**BEGINNING** of the contraction to the **END** of that same contraction	• Lasts 45 - 80 seconds • Should not exceed 90 seconds *Only measured through external monitoring*	
Frequency	Number of contractions from the **BEGINNING** of one contraction to the **BEGINNING** of the next	• 2 - 5 contractions every 20 minutes • Should not be more FREQUENT then every 2 minutes *Only measured through external monitoring*	
Intensity	Strength of a contraction at its **PEAK**	• 25 - 50 mm Hg • Should not exceed 80 mm HG *Can be palpated*	*Mild - nose* *Moderate - chin* *Strong - forehead*
Resting Tone	**TENSION** in the uterine muscle between contractions (relaxation of the uterus = fetal oxygenation between contractions)	• Average: 10 mm HG • Should not exceed 20 mm HG *Can be palpated*	*Soft = good* *Firm = not resting enough*

LABOR & BIRTH PROCESSES

5 P's 5 factors that affect the process of labor & birth

PASSENGER	PASSAGEWAY	POSITION	POWERS	PSYCHOLOGY
Fetus & Placenta	The Birth Canal	Position of the Mother	Contractions	Emotional Response

PASSENGER

FETUS & PLACENTA

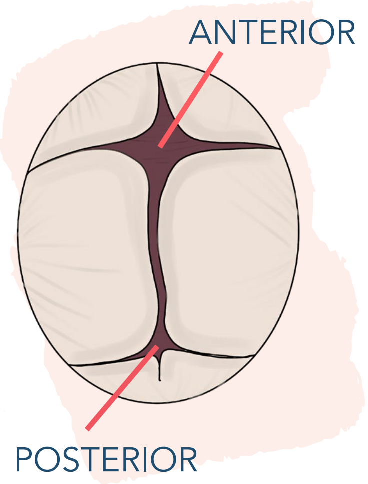
SIZE OF THE FETAL HEAD

FONTANELS

- Space between the bones of the skull allows for molding
- Anterior (larger)
    - Diamond-shaped
    - Ossifies in 12-18 months
- Posterior
    - Triangle shaped
    - Closes 8 - 12 weeks

MOLDING

- Change in the shape of the fetal skull to "mold" & fit through the birth canal



FETAL PRESENTATION

Refers to the part of the fetus that enters the pelvic inlet first through the birth canal during labor

CEPHALIC Most Common

- Head first
- Presenting part: Occipital (back of head/skull)

BREECH

- Buttocks, feet, or both first
- Presenting part: Sacrum

SHOULDER

- Shoulders first
- Presenting part: Scapula

FETAL LIE

Relation of the long axis (spine) of the fetus to the long axis (spine) of the mother

LONGITUDINAL OR VERTICAL

- The long axis of the fetus is parallel with the long axis of the mother
- Longitudinal: cephalic or breech

TRANSVERSE, HORIZONTAL, OR OBLIQUE

- Long axis of the fetus is at a right angle to the long axis of the mother
- Transverse: vaginal birth **CANNOT** occur in this position
- Oblique: usually converts to a longitudinal or transverse lie during labor

CONTINUED →

LABOR & BIRTH PROCESSES

PASSENGER

CONTINUED

FETAL ATTITUDE

GENERAL FLEXION

- Back of the fetus is rounded so that the chin is flexed on the chest, thighs are flexed on the abdomen, legs are flexed at the knees

BIPARIETAL DIAMETER

- 9.25 cm at term, the largest transverse diameter and an important indicator of fetal head size

SUBOCCIPITOBREGMATIC DIAMETER

- *Most critical* & smallest of the anteroposterior diameters

LIGHTENING

What is this?

When the baby "drops" into the mother's pelvis

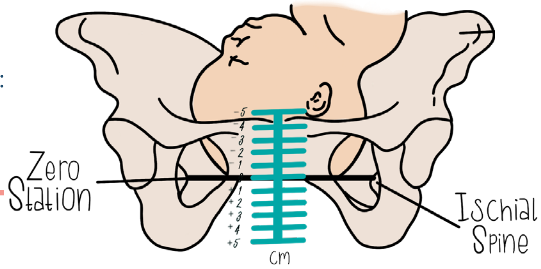
FETAL POSITION

FETAL STATION

- Where the baby's **presenting part** is located in the pelvis
- **Presenting part?**
  - Head, foot, butt (closest to exit of uterus)
- Measured in centimeters (cm)
  - Find the ischial **spine = zero**
  - **Above the ischial spine is (-)**
  - **Below the ischial spine is (+)**
    - +4 / +5 = Birth is about to happen
  - Documented
    - -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5

ENGAGEMENT

- Fetal station zero = baby is "**engaged**"
- Presenting parts have entered down into the pelvis inlet & is at the ischial spine line (0)
- When does this happen?
  - First-time moms: 38 weeks
  - Already had babies: can happen when labor starts



PASSAGEWAY

THE BIRTH CANAL: Rigid bony pelvis, soft tissue of cervix, pelvic floor, vagina & introitus

TYPES OF PELVIS

● **GYNECOID**
- Classic female type
- Most common

♥ **ANDROID**
- Resembling the male pelvis

⬮ **ANTHROPOID**
- Oval-shaped
- Wider anteroposterior diameter

⬬ **PLATYPELLOID**
- The flat pelvis
- Least common

SOFT TISSUE

LOWER UTERINE SEGMENT

- Stretchy

CERVIX

- Effaces (thins) & dilates (opens)
- After fetus descends into the vagina, the cervix is drawn upward and over the first portion

PELVIC FLOOR MUSCLES

- Helps the fetus rotate anteriorly

VAGINA

INTROITUS

- External opening of the vagina

LABOR & BIRTH PROCESSES

POSITION

POSITION OF THE MOTHER DURING BIRTH

UPRIGHT POSITION
Sitting on a birthing stool or cushion

"ALL FOURS" POSITION
On all fours: putting your weight on your hands & feet

LITHOTOMY POSITION Most Common
Supine position with buttocks on the table

LATERAL POSITION
Laying on a side

Frequent changes in position helps with:

- Relieving fatigue
- Increasing comfort
- Improving circulation

POWERS

CONTRACTIONS: PRIMARY & SECONDARY

PRIMARY POWERS

Involuntary uterine contractions
Signals the beginning of labor

DILATION

- Dilation of the cervix is the enlargement or widening of the cervical opening & canal once labor has begun
- Cervix: closed → full dilation (10 cm)
- Pressure from amniotic fluid can also apply force to dilate

EFFACEMENT

- Shortening & thinning of the cervix during the first stage of labor
- Cervix normally:
  - 2 -3 cm long
  - 1 cm thick
- The cervix is "pulled back / thinned out" by a shortening of the uterine muscles

Degree of EFFACEMENT is EXPRESSED in % (0-100%)

FERGUSON REFLEX

- When the stretch receptors release oxytocin, it triggers the maternal urge to bear down

SECONDARY POWERS

Does not affect cervical dilation but helps with expulsion of infant once the cervix is fully dilated

- Voluntary bearing-down efforts by the women once the cervix has dilated
- When the presenting part reaches the pelvic floor, the contractions change in character & become expulsive.
- Laboring women start to feel an involuntary urge to push & she uses secondary powers to aid in the expulsion of the fetus

PSYCHOLOGY

EMOTIONAL RESPONSE

Anxiety can increase pain perception & the need for more medications (analgesia & anesthesia)

THINGS TO CONSIDER:

- SOCIAL SUPPORT
- PAST EXPERIENCE
- KNOWLEDGE

NEWBORN ASSESSMENT

APGAR

7 - 10 supportive care
4 - 6 moderate depression
< 4 aggressive resuscitation

SCORE	O POINTS	1 POINT	2 POINTS
A **Activity** (Muscle tone)	Absent	Flexed arms & legs	Active
P **Pulse**	0	< 100	> 100
G **Grimace** (Reflex irritability)	Floppy	Minimal response to stimulation	Prompt response to stimulation
A **Appearance** (Skin color)	Blue / pale all over	Pink body, Blue extremities (acrocyanosis)	Pink all over
R **Respiration** (Effort)	No Breathing	Slow & irregular	Vigorous cry

INITIAL GOALS:

1ST PRIORITY = AIRWAY

Suction with bulb syringe / deep suction
*Newborns are obligatory nose breathers

2ND PRIORITY = WARMTH

Dry with a blanket or place in warmer

VITAL SIGNS

Respiratory Rate:
30 - 60 breaths/min

Breathing pattern is **IRREGULAR**.
Newborns are ***abdominal*** breathers.
To count breaths, place your hand on their abdomen
Count for a full minute!

Heart Rate: 110 - 160 BPM
Can be 180 if *crying*
Can be 100 if *sleeping*
Take apical pulse for 1 full min

Temperature (auxillary):
97.7° - 99.5° F
36.5° - 37.5° C

Blood Pressure:
Not done routinely
Systolic 60 – 80 mm Hg
Diastolic 40 – 50 mm Hg

MAP
Equal to the # of weeks gestation or higher

Signs of Respiratory Distress

Retractions
Nasal flaring
Grunting

CIRCULATORY SYSTEM

- Blood flow from umbilical vessels & placenta stop at birth
- **Acrocyanosis**:
  - Blueness of hands & feet (normal during the first 24 hours of life)
- Closure of
  - Ductus arteriosus
  - Foramen ovale
  - Ductus venosus
- Transient murmurs are normal

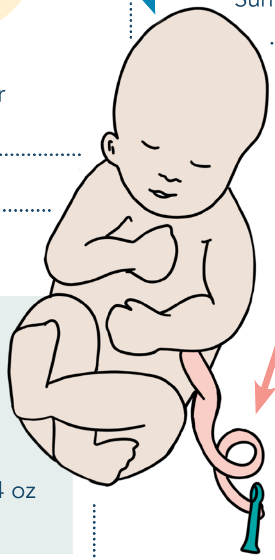
HEAD

Caput Succendeum:
- Edema (collection of fluid)
- Crosses the suture lines
- (Like a baseball *cap*)

Cephahemtaoma:
- Birth trauma (collection of blood)
- Does not cross the suture lines

- **Molding**: abnormal head shape that results from pressure (*normal*)
- **Fontanelles**:
  Bulging = increase ICP or hydrocephalus
  Sunken = dehydration

Fontanelles may be bulging when the newborn cries, vomits, or is lying down. This is normal.



UMBILICAL CORD

Should have **2 arteries** & **1 vein**

A A
V

Should be dry, no odor, & no drainage

GENERAL CHARACTERISTICS

Head & Chest Circumference

Head circumference
32 - 39 cm
14 - 15 inches
*measure above eyebrows

Chest circumference
30 - 36 cm
12 - 14 inches
*measure above nipple line

Length & Weight

Expected Length
44 - 55 cm
17 - 22 in

Expected Weight
2,500 - 4,000 g
5 lb, 8 oz - 8 lb, 14 oz

↓ TEMP → HEAT LOSS DUE TO:

Evaporation: Moisture from skin & lungs
Convection: Body heat to cooler air
Conduction: Body heat to a cooler surface in direct contact
Radiation: Body heat to a cooler object nearby

POSTPARTUM ASSESSMENT: "BUBBLES"

B BREASTS

- May be sore after breastfeeding
- Breastfeed every 2 - 3 hours (15 - 20 minutes each breast)
- Position newborn "tummy to mummy"
- Latch should be completey around the areola

MASTITIS

Infection & inflammation of breast tissue

- Continue breastfeeding
- Warm compress
- Hydration
- Rest
- Analgesics
- Wash hands!

U UTERUS

UTERINE ATONY

RISK FACTORS
- Retained placenta
- Chorioamnionitis (infection)
- Uterine fatigue
- Full bladder

SYMPTOMS
- Enlarged
- Soft
- Boggy
- Not midline
- Poorly contracted uterus

INTERVENTIONS
- Fundal massage
- Assist to void or use in-and-out catheter

B BOWELS

Constipation is common after birth. Increasing **FLUIDS & FIBER** may help!

HEMORRHOIDS

- May see blood in the stool
- Should begin to shrink following birth

INTERVENTIONS
- Tucks / witch hazel
- Ice pack
- Squeeze bottle
- Sitz Bath

B BLADDER

- Postpartum urinary retention is common
  - In-and-out caterization may be needed
  - Bladder distention can cause a displaced & boggy utuerus!

L LOCHIA

SIGNS OF INFECTION ⚠

- Foul smelling or purulent lochia
- Fever (>100.4 F)
- Abdominal tenderness
- Tachycardia

"Really Sore After"

RUBRA	**bright red** 1 - 3 days
SEROSA	**pinkish/brown** 4 - 10 days
ALBA	**whitish-yellow** 10 - 14 days **Can last up to 6 weeks*

E EMOTIONAL STATUS

- Postpartum depression (PPD) is common for women following childbirth →
  - Crying
  - Irritable
  - Sleep disturbances
  - Anxiety
  - Feelings of guilt
- As the nurse ask about feelings of...
  depression • hopelessness • self-harm • harm to the newborn

S SECTION (c-section incisions) / Episiotomy

- Promote proper wound healing
- Report to the health care provider: *pain • inflammation • surrounding skin is warm to touch*

POSTPARTUM HEMORRHAGE

Postpartum Hemorrhage is defined as:

VAGINAL BIRTH: loss of >500 ml of blood

CESAREAN BIRTH: loss of >1,000 ml of blood

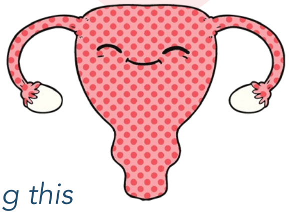
A CHANGE IN HEMATOCRIT BY 10%

PATHOLOGY

The uterus is like a **BASKET WEAVE OF MUSCLE FIBERS** that crimps off vessels **protecting mom from hemorrhage.**

If the uterus is not doing this crimping off, it causes bleeding!

The uterus is often called the **LIVING LIGATURE**



SIGNS & SYMPTOMS

- Hypotonia of the uterus
- Atony / boggy uterus
- Deviated to the right
- Uncontrolled bleeding

#1 cause of uterine atony is A FULL BADDER

RISK FACTORS

- Multiple gestations
- Polyhydramnios
- Macrosomic fetus (> 8 lbs)
- Multifetal gestation

overdistended uterus

DRUGS

"OH MY HEMORRHAGE" → This is a way to remember the order in which the drugs are used

#1 OXYTOCIN

"Pitocin"

ACTION
Stimulates contraction of the uterine smooth muscle

#2 METHERGINE

"Methylergonovine"

ACTION
Vasoconstriction

CONTRAINDICATIONS
Contraindicated in people with hypertension

**Remember vasocontriction causes blood pressure to rise*

#3 HEMABATE

ACTION
Hemabate is a prostaglandin! Hemabate helps control blood pressure and muscle contractions (uterine contractions).

CONTRAINDICATIONS
Contraindicated in people with asthma

ANOTHER MEDICATION THAT CAN BE USED:

MISPROSTOL

given rectally

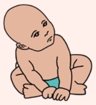
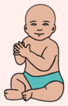
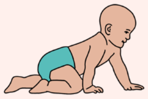
ACTION
Stimulates contraction of the uterine smooth muscle

PEDIATRIC MILESTONES

PEDIATRIC MILESTONES

INFANT

BIRTH - 12 MONTHS

	GROSS MOTOR	FINE MOTOR	LANGUAGE
1 MONTH	• Head lag • Rounded back while sitting • Lifts and turns head to the side in prone position	• Fists mostly clenched • Involuntary hand movements	
2 MONTHS	• Raises head & chest • Head control improving		• Makes verbal noise (coos)
3 MONTHS	• Raises head 45 degrees in prone • Tiny head lag in pull-to-sit	• Holds hand in front of face with hands open	
4 MONTHS	• Lifts head & looks around • Rolls from prone to supine • Head leads body when pulled to sit **FUN TIP!** **Rolls on the floor rhymes with four!**	• Bats at objects	• Babbling (copies noises)
5 MONTHS	• Rolls from supine to prone & back again • Sits with back upright when supported	• Grasps rattle **FUN TIP!** **You grasp something with five fingers**	
6 MONTHS	• Tripod sit 	• Releases objects in hand to take another	• Babbles (nonspecific)
7 MONTHS	• Sits alone with some use of hands for support	• Transfers objects from one hand to the other	
8 MONTHS	• Sits unsupported 	• Gross pincer grasp (rakes)	
9 MONTHS	• Crawls with abdomen off the floor 	• Bangs objects together	
10 MONTHS	• Pull to stand • Able to cruise on objects (furniture)	• Fine pincer grasp • Puts objects into containers & takes them out	
11 MONTHS		• Offers objects to others & releases them	
12 MONTHS	• **Walks independently** • Sits down from standing position without assistance	• Feeds self finger-foods • Draws simple marks on paper • Turns pages in a book	▪ **RECEPTIVE LANGUAGE** ▪ **EXPRESSIVE LANGUAGE** ▪ **SIGNS OF DELAY**

RECEPTIVE LANGUAGE	EXPRESSIVE LANGUAGE	⚠ SIGNS OF DELAY ⚠
• Understands common words independent of context • Follows a one-step gestured command	• First word (example: "mama") • Uses a finger to point to things • Imitates: gestures & vocal	• After independent walking for several months - Persistent tiptoe walking - Failure to develop a mature walking pattern

PEDIATRIC MILESTONES

TODDLER 1-3 YEARS

	15 MONTHS	18 MONTHS	24 MONTHS	30 MONTHS
GROSS MOTOR	• Walks independently 	• Climbs stairs • Pulls toys	• Kicks a ball • Able to stand on tiptoes • Climbs on & off furniture **FUN TIP!** **Think: terrible twos!**	
FINE MOTOR	• Feeds self finger foods • Uses index finger to point • Full pincer grasp developed	• Uses their hands a lot for: reaching, grabbing, releasing, stacking blocks • Turns book pages • Removes shoes and socks • Stacks four cubes	• Builds tower of 6-7 cubes • Right/left-handed • Scribbles, paints, & imitates strokes • Turns doorknobs • Puts round pegs into holes	
RECEPTIVE LANGUAGE	• Understands 100-150 words • Follows commands without gestures • Looks at adults when communicating	• Understands "no" • Understands 200 words • Says: "what's this?"	• Points to named body parts/pictures in books • Listens to simple stories • Says: "my" & "mine"	• Follows a series of 2 independent commands
EXPRESSIVE LANGUAGE	• Repeats words • Babbles sentences	• Vocab: 15-20 words • Uses names of familiar objects	• Vocab: 40-50 words • Sentences of 2-3 words (ex. "want cookie") • Use descriptive words: hungry, hot, cold	• Vocab:150-300 words
SIGNS OF DELAY	• Persistent tiptoe walking • Does not develop a mature walking pattern	• Not walking • Not speaking 15 words • Does not understand the function of common household items	• Does not: use two-word sentences, imitate actions, or follow basic instructions • Cannot push a toy with wheels	

PEDIATRIC MILESTONES

PRESCHOOL 3-6 YEARS

	3 YEARS	4 YEARS	5 YEARS

GROSS MOTOR	• Climbs well and runs easily
	• Pedals tricycle
	• Walks up & down stairs with alternating feet
	• Bends over without falling
		• Throws ball overhead
		• Kicks ball forward
		• Can bounce a ball back
		• Hops on one foot
		• Alternating feet going up & down steps
			• May be able to:
			  • Skip
			  • Swim
			  • Skate
			  • Climb
			  • Swing

FINE MOTOR	• Undresses self • Copies circles • Tower of 9-10 • Holds a pencil • Screws and unscrews lids • Turns book pages one at a time	• Uses scissors • Copies capital letter • Draws circles, squares, & traces a cross or diamond • Draws a person with 2-4 body parts • Laces shoes	• Can draw a person and some letters • May dress/undress themselves • Can use a fork, spoon, & knife • Mostly cares for own toileting needs
COMMUNICATION	• Understands most sentences • Understands physical relation (in, on, under) • Follows a 3-part command • Half of the conversation understood by outside family • Says: "why?" • 3 or 4-word sentences • Talks about past • Vocab: 1,000 words • Says their name, age, & gender • Uses pronouns and plurals 	• Speaks in complete sentences • Tells a story • 75% of speech understood by outside observers • Stays on topic in conversation • Knows the name of familiar animals • Knows at least one color • Uses language to engage in make-believe • Can count a few numbers • Vocab: 1,500 words	• Most of the child's speech can be understood • Explains how an item is used • Participates in long & detailed conversations • Talks about past, future, and imaginary events • Answers questions that use "why" and "when" • Can count to 10 • Says name & address • Recalls part of a story • Speech should be completely intelligible, even if the child has articulation difficulties • Speech is generally grammatical correct • Vocab: 2,000 words
⚠ SIGNS OF DELAY ⚠	 • Difficulty with stairs • Falls a lot while walking • Can't build a 4+ block tower • Extreme difficulty separating from parents • No make-believe play • Can't copy a circle • No short paragraphs • Doesn't understand simple instructions • Unclear speech & drooling • Little interest in other kids	• Can't jump in place or ride a tricycle • Can't stack 4 blocks • Can't throw a ball overhead • Does not grasp crayon with thumb and fingers • Difficulty with scribbling • Can't copy a circle • Doesn't say 3+ word sentences • Can't use the words "me" & "you" • Ignores other children or doesn't show interest in interactive games • Still clings or cries if parents leave	 • Sad often • Little interest in playing with other kids • Unable to separate from their parents • Is extremely aggressive, fearful, passive, or timid. • Easy distracted (can't concentrate for 5 minutes) • Can not do ADL's by themselves (brush teeth, undress, wash & dry hands, etc) • Rarely engages in fantasy play

PEDIATRIC MILESTONES

PHYSIOLOGICAL CHANGES

	EARLY ADOLESCENCE 10-13 YEARS	MIDDLE ADOLESCENCE 14-16 YEARS	LATE ADOLESCENCE 17-20 YEARS
MALE	• Pubic hair spread laterally, begins to curl, pigmentation increases • Growth & enlargement of testes & lengthening of the penis • Lengthy look due to extremities growing faster than the trunk	• Pubic hair becomes more coarse in texture & takes on adult distribution • Testes, scrotum, & penis continue to grow • The skin around the scrotum darkens • Glands penis develops • May experience breast enlargement • Voice changes	• Mature pubic hair distribution & coarseness • Breast enlargement disappears • Adult size & shape of testes, scrotum, and penis • Scrotum skin darkening
FEMALE	• First menstrual period (average age is 12 years) • Breasts bud and areola continue to enlarge (no separation of the breasts) • Pubic hair begins to curl & spread over the mons pubis	• Pubic hair becomes coarse in texture • Amount of hair increases • Areola & papilla separate from the contour of the breasts to form a secondary mound	• Mature pubic hair distribution and coarseness

PEDIATRICS

PEDIATRIC CPR (<12 MONTHS)

Cardiac arrest in infants usually stems from **RESPIRATORY ETIOLOGY**

PEDIATRIC VITAL SIGNS

AGE	RESPIRATIONS	PULSE	SYSTOLIC BP
NEWBORN	30 - 50	120 - 160	60 - 80
6 MO - 1 YR	30 - 40	120 - 140	70 - 80
2 - 4 YR	20 - 30	100 - 110	80 - 95
5 - 8 YR	14 - 20	90 - 100	90 - 100
8 - 12 YR	12 - 20	80 - 100	100 - 110
> 12 YR	12 -20	60 - 90	100 - 120

BREATHS/ MIN

BEATS/ MIN

ORDER OF EVENTS

1 PULSE

- Check pulse no longer than 10 seconds

  INFANT: Check **BRACHIAL** pulse

  CHILD: Check **CAROTID** pulse

2 CALL FOR HELP

- Active the emergency response system / shout for nearby **HELP**
- Delegate someone else to call 911 / get the AED

3 CHEST COMPRESSIONS

- 2 minutes of CPR before retrieving the AED
  - Rate of 100 - 120 compression/min
  - Using either 2 fingers or 2 thumbs on the sternum
  - Depth: **INFANT:** Equal to one-third of chest's anterior-posterior diameter

    CHILD: 2 inches
  - Allow for recoil between compressions

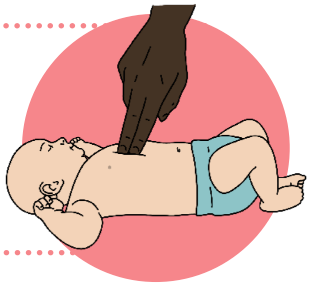
SINGLE RESCUER

30:2 compression-to-breath ratio

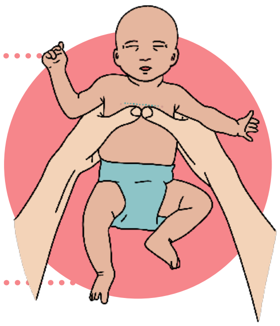
TWO RESCUERS

15:2 compression-to-breath ratio

2-FINGER COMPRESSION TECHNIQUE



2-THUMB ENCIRCLING HAND TECHNIQUE



4 CONTINUE UNTIL SIGNS OF HELP ARRIVE OR AED BECOMES AVAILABLE

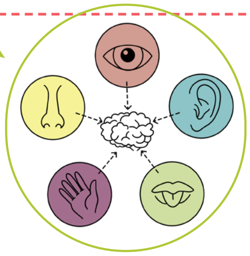
PIAGET'S STAGES OF COGNITIVE DEVELOPMENT

MNEMONIC → **S**AYING **P**IAGET'S **C**OGNITIVE STAGES IS **F**UN

SENSORIMOTOR STAGE

0 - 2 YEARS

- Development through our 5 senses
- Development through motor response
- **OBJECT PERMANENCE** is developed
- Egocentric
    - ➡ Can only see the world from one's own point of view



Realizing that objects that are out of sight still exist

PREOPERATIONAL STAGE

2 - 7 YEARS

- Symbolic thinking
- Imagination
- Abstract thinking is still difficult
- Asks a lot of questions (intuition)

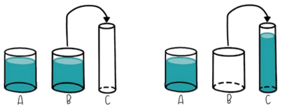
→

- Magical thinking
- **ANIMISM** - thinks objects are alive
- Plays pretend

CONCRETE OPERATIONAL STAGE

7 - 11 YEARS

- Develop concrete cognitive operations
    - ➡ Sorting blocks in a certain order
- **CONSERVATION** is developed
- Conductive reasoning (Mathematical advancements)



CONSERVATION
Understanding that something stays the same in volume even though its shape changes.

FORMAL OPERATIONAL STAGE

> 11 YEARS

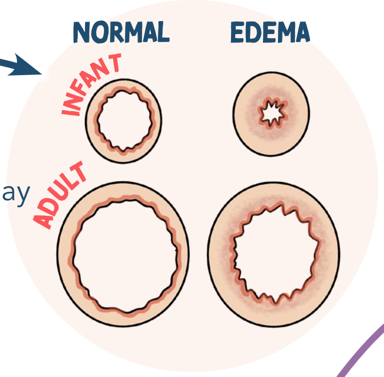
EMPTY
HALF
FULL

- More rational, logical, organized, moral, and consistent thinking
- **HYPOTHETICAL THINKING** - Can think outside the present
- Abstract concepts
    - ➡ Love, hate, failures, successes
- Deductive reasoning

VARIATIONS IN PEDIATRIC ANATOMY & PHYSIOLOGY

RESPIRATORY

- Narrow airways
- Newborns have ↓ alveoli than an adult
  - ➥ Thousands of alveoli grow each day for the first few months of life!
- Floppy airways from less cartilage
- Obligatory nose breathers
- ↑ metabolic rate
- ↑ O2 requirements



HEAD SIZE

- Head is the fastest growing part of an infant (large in proportion to the body!)
- Head & neck muscles are not well developed

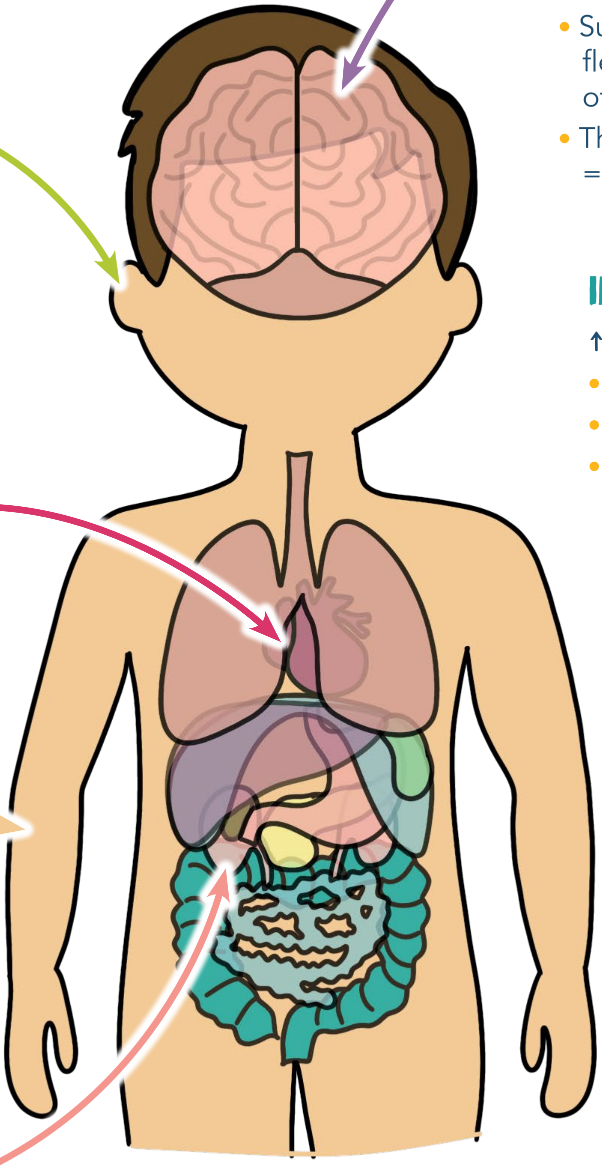
BRAIN & SPINAL CORD

- Cranial bones not completely fused
- The brain is highly vascular = ↑ risk for hemorrhage
- Sutures & fontanels makes the skull flexible and allows for growth of the brain
- The spine is very mobile = ↑ risk for cervical spin injury

EARS

↑ RISK FOR EAR INFECTION

- Eustachian tubes are short, wide, & flat
  = making drainage difficult
  = harbors microorganisms



IMMUNE SYSTEM

↑ RISK FOR INFECTION

- Immature immune systems
- ↓ inflammatory response
- Limited exposure to disease (losing immunity from maternal antibodies)

CARDIOVASCULAR

- The transition from fetal circulation → normal circulation at birth
- Infants hearts are thinner and less compliant

NERVOUS SYSTEM

- Myelinization is incomplete at birth
- Myelinization happens in **CEPHALOCAUDAL DIRECTION** (head to tail)

SKIN

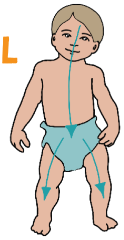
- Epidermis is thinner
- Blood vessels are closer to the surface - loses heat very easily!

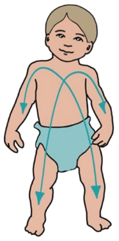
KIDNEYS

- Kidneys are larger in relation to abdomen = less protection
- GFR is slower
- ↓ ability to concentrate urine & reabsorb = ↑ risk for dehydration

CEPHALOCAUDAL DIRECTION (HEAD TO TAIL)

HEAD CONTROL BEFORE WALKING!





PROXIMODISTAL (INWARD OUTWARD)

SUDDEN INFANT DEATH SYNDROME (SIDS)

SUDDEN DEATH OF A PREVIOUSLY HEALTHY INFANT YOUNGER THAN 1 YEAR OF AGE

RISK FACTORS

- AGE: 1 - 6 months (↑ risk)
- Preterm
- Sleep position
- Sibling death
- Nicotine exposure
- Socioeconomic status
- Lack of prenatal care
- Genetic
- Bedding (can be smothered)
- Room temp (cooler is better)

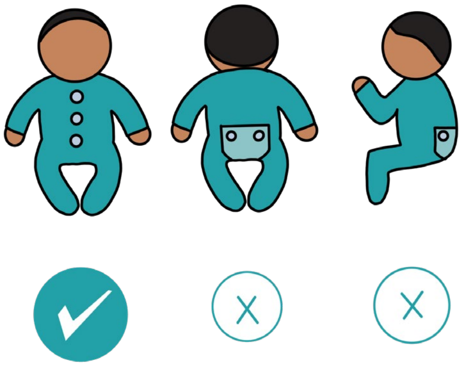
THERE ARE
NO
SIGNS OR SYMPTOMS!

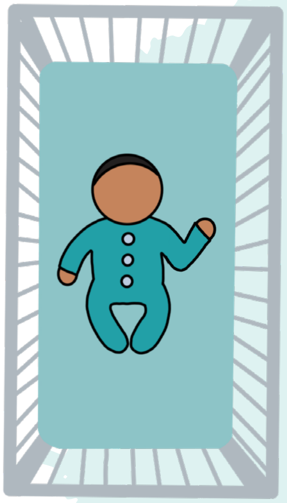
Sudden death

Leading cause of death in infants

EDUCATION / PREVENTION

- Sleep in **SUPINE POSITION**
- Bedding
  - **Firm** mattress
  - No toys, blankets, pillows, or stuffed animals
- Avoid over bundling or overdressing the infant
- Avoid smoking
- **No co-bedding**
  (Infant should sleep separate from the parents)
- Normal room temp
- Encourage pacifier use





MEMORY TRICK

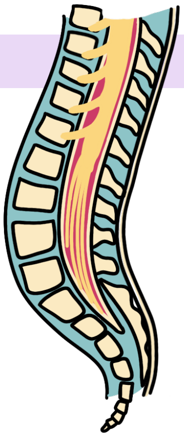
ABC'S OF SAFE SLEEPING

A **A**lone

B On their **B**ack

C In a **C**rib

NEURAL TUBE DEFECTS



NORMAL SPINE

The neural tube closes:
3rd - 4th week of gestation

SPINA BIFIDA

is a general term for a birth defect typically diagnosed during pregnancy where the spinal column fails to close.

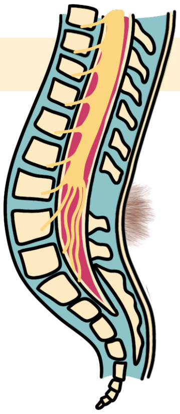
Spina bifida means **"SPLIT SPINE"**

CAUSES

NOT KNOWN...

BUT MANY FACTORS HINDER NORMAL CNS DEVELOPMENT

- Drugs
- Malnutrition
- Chemicals
- Genetics
- Folic acid deficiency (Vitamin B9)
- Diabetes
- Obesity



SPINA BIFIDA OCCULTA

MILDEST FORM

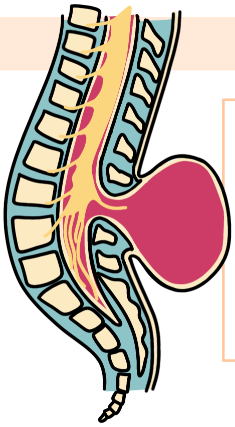
Defect of the vertebral body **WITHOUT** protrusion of the spinal cord or meninges.

Typically asymptomatic

May have dimpling, abnormal patches of hair, or discoloration near the spine.

Does not need immediate medical care if asymptomatic.

If symptoms are present, the client may get an MRI.



MENINGOCELE

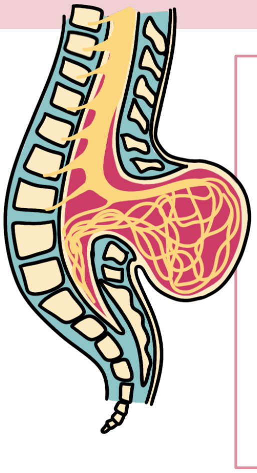
Sac protruding from the spinal area.

Most are covered with skin.

Meninges herniate through a defect in the vertebrae.

Usually minor or no neurological deficits.

Surgical correction of the lesion



MYELOMENINGOCELE

MOST SEVERE FORM

Protrusion of the meninges, cerebrospinal fluid, and spine.

Skin may be exposed as well.

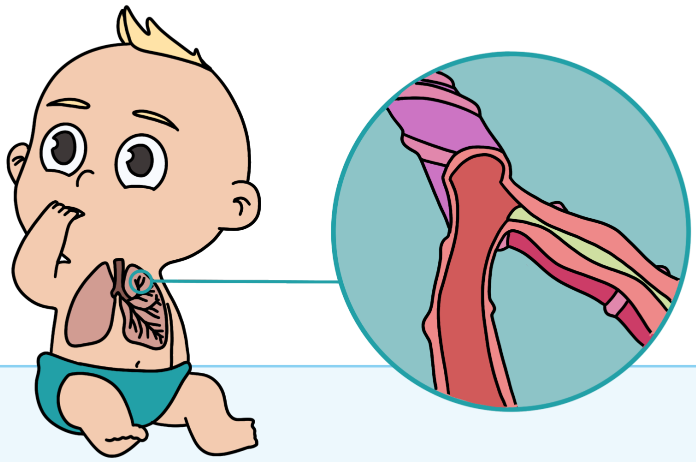
The spinal cord often ends at the point of the defect.

=

Absent motor & sensory function beyond that point.

- Multiple surgical procedures
- Paralysis
- Bladder / bowel incontinence
- Neurogenic bladder
- Meningitis (infection)
- Hypoxia
- Hemorrhage
- Freq. catheterization causes...
  - ➡ Latex allergy
  - ➡ UTIs / pyelonephritis
  - ➡ Renal damage

BRONCHIOLITIS (RSV)



PATHO

small airways in the lungs

BRONCHIOLITIS

inflammation

- Viral illness usually caused by **Respiratory syncytial virus (RSV)**
- Very contagious
- Starts as an upper respiratory infection & moves into the chest

SIGNS & SYMPTOMS

INITIAL

- Upper respiratory symptoms
  - Nasal congestion
  - Runny nose
  - Cough
  - Sneezing
- Fever

CONTINUED

- Lower respiratory tract symptoms
  - Tachypnea
  - Cough
  - Wheezing

EMERGENT

- Grunting
- Nasal flaring
- Cyanosis
- Hypoxia
- Respiratory failure
- Apneic episodes

TREATMENT

- Self-limited illness & supportive care
- Airway maintenance
  - Oxygen
  - Suctioning
    Saline nose drops & then suction the nares with a bulb syringe to remove the secretions before feeding or at bedtime
  - Position the child at a 30 - 40 degree angle
- Hydration
  Increase fluid intake (oral or IV) (risk for dehydration)
- Hospitalization
  Only necessary if the child has severe symptoms
- Use contact & standard precautions during care

MOST CHILDREN CAN BE MANAGED AT HOME

REYES SYNDROME

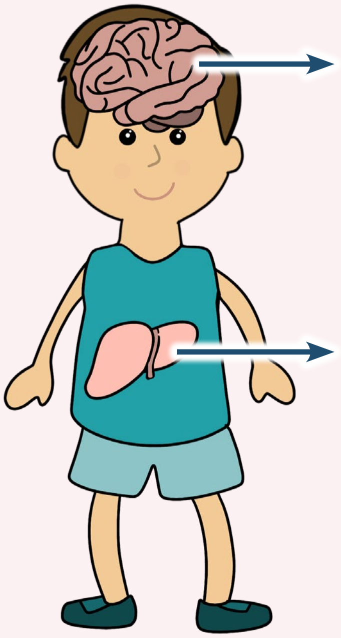
RARE DISEASE AFFECTING YOUNG CHILDREN RECOVERING FROM A VIRAL ILLNESS (FLU OR CHICKEN POX)

CAUSE

EXACT CAUSE UNKNOWN

Triggered due to the intake of salicylates or salicylate-containing products *such as* **aspirin** *to treat a viral illness* (Flu / Chickenpox)

SIGNS & SYMPTOMS



ENCEPHALOPATHY / CEREBRAL EDEMA

ACUTE FATTY LIVER FAILURE

LABS

↑ LIVER ENZYMES
↑ AST
↑ ALT

"CHILDS"

- **C** Confusion (changes in mental status)
- **H** Hyperreflexia
- **I** Irritability
- **L** Lethargy
- **D** Diarrhea & vomiting
- **S** Seizures

TREATMENT

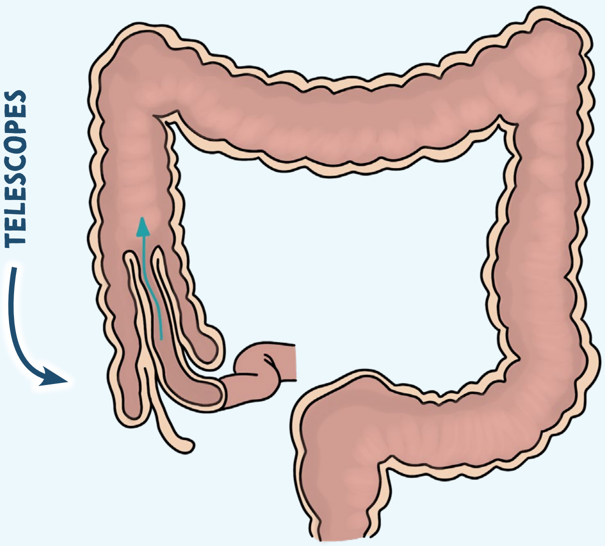
- Early recognition & treatment
- Education on prevention!
- Monitor fluid status
- Swelling of the brain occurs
  - ➡ Maintaining cerebral perfusion
  - ➡ Managing & preventing increased ICP
  - ➡ Seizure precautions

Educate on products that contain **SALICYLATES:**

ASPIRIN
ALKA-SELTZER
PEPTO-BISMOL
KAOPECTATE

INTUSSUSCEPTION

PATHO



ILEUM TELESCOPES INTO THE CECUM

↓

OBSTRUCTION = PAIN

↓

COMPRESSION OF BLOOD VESSELS

↓

BLOOD FLOW DECREASES

↓

BOWEL ISCHEMIA

↓

RECTAL BLEEDING (CURRANT JELLY STOOLS!)

SIGNS & SYMPTOMS

- Intermittent pain / cramping
- Child draws up their legs toward the abdomen in severe pain while crying
- Vomiting & diarrhea
- Currant-jelly stools (bloody)
- Lethargy
- Sausage-shaped mass in the upper mid-abdomen

THIS IS BECAUSE TELESCOPING IS INTERMITTENT

CAUSES

- **NOT COMPLETELY KNOWN**
- May be due to a virus that causes swelling
- Condition child is born with
  - ➡ Diverticulum
  - ➡ Polyps

TREATMENT

- May spontaneously be reduced (Passage of normal, brown stools)
- IV fluids
- Antibiotics
- Decompression via NG tube
- Provide comfort & emotional support to the parents
- Monitor for signs of perforation & shock
- May need air or barium enema
  - ➡ Provide education to child & family about pre-op & post-op

DIAGNOSTIC / TREATMENT

AIR or BARIUM ENEMA works to diagnose & also helps reduce the intussusception

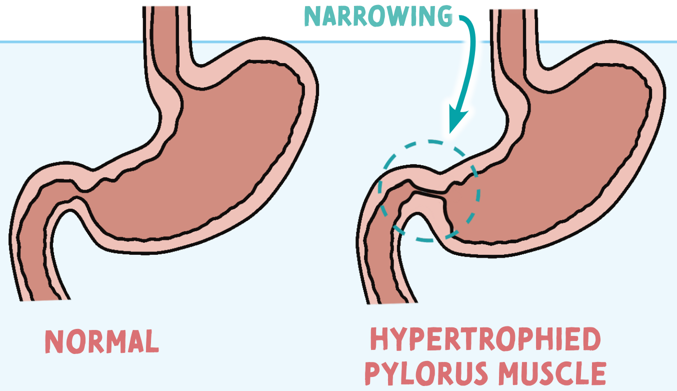
HYPERTROPHIC PYLORIC STENOSIS

PATHO

A HYPERTROPHIED PYLORIC MUSCLE CAUSES NARROWING OF THE PYLORIC CANAL

↓

THICKNESS CREATES A NARROW STOMACH OUTLET



HYPERTROPHIC ↓ INCREASE IN SIZE

PYLORIC ↓ PYLORUS

STENOSIS ↓ NARROWING

Opening from the stomach into the small intestines

SIGNS & SYMPTOMS

- Projectile vomiting →
- Non-bilious emesis
- Olive-shape mass palpable in the right upper quadrant
- Infants will be hungry constantly despite regular feedings
- Weight loss
- DEHYDRATION!

↑ Hematocrit from hemoconcentration
↑ BUN

STOMACH CONTAINS ACID WHICH BECOMES DEPLETED WHEN VOMITING WHICH LEADS TO **METABOLIC ALKALOSIS**

↑PH & ↑HCO3

TREATMENT

- Monitor ...
  - ➥ I&O's
  - ➥ Vomiting episodes & stools
  - ➥ Signs of dehydration & electrolyte imbalances
- Obtain daily weights
- Provide comfort & emotional support to the parents
- Educate about surgery

PYLOROMYOTOMY

Cut the muscle of the pylorus

↓

Relieving the gastric outlet obstruction

EPIGLOTTITIS

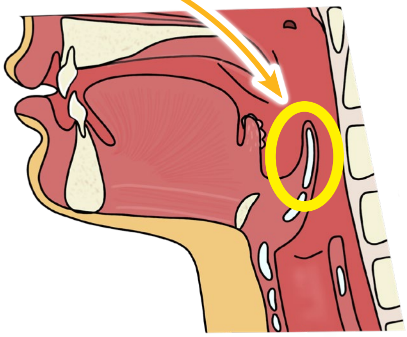
PATHO

Inflammation
of the
EPIGLOTTIS
leading to an
UPPER AIRWAY OBSTRUCTION

WHAT IS THE EPIGLOTTIS?

Piece of cartilage
at the back of the tongue

FUNCTION:
Closes the entry to the trachea
during swallowing....
AKA prevents aspiration



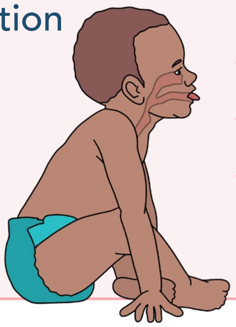
CAUSES

- Most common cause: **HAEMOPHILUS INFLUENZA TYPE B**
- Streptococcus pneumonia

PEDS incident falling due to Hib vaccination

SIGNS & SYMPTOMS

- Tachycardia
- Sore throat
- High fever
- Anxious / apprehensive / agitation
- Difficulty speaking
- Nasal flaring
- Stridor
  (Frog-like croak on inspiration)
- Drooling / dysphagia
- **Tripod position**
- Sitting forward with the neck extended to breath - mouth open
- Retractions (chest)
- Nasal flaring
- Absent cough!



NURSING MANAGEMENT

- Never leave the client
- Asses oxygen status
- IV access
- May need emergency intubation
- Calm environment
  - Stay with parents
  - Don't restrain the child
  - Help to avoid crying
  - Most comfortable position (usually tripod position)
- Do not place them in supine position. It becomes harder to breathe.

Do not visualize the throat with a tongue blade.
Take oral temperature or take throat culture...
WHY? It can cause **REFLEX LARYNGOSPASMS**
(cutting off the airway)

- NPO
- Medications
  - Antibiotics
  - Antipyretics
  - Corticosteroids *(decrease inflammation)*
  - IV Fluids

LARYNGOTRACHEOBRONCHITIS "CROUP"

PATHO

Inflammation of the
LARYNX, TRACHEA, & BRONCHI
occur as a result of viral infection

Most commonly caused by
the **PARAINFLUENZA VIRUS**

LARYNGO	TRACHEO	BRONCHI	ITIS
↓	↓	↓	↓
LARYNX	TRACHEA	BRONCHI	INFLAMMATION

SIGNS & SYMPTOMS

- Inflammation & edema obstructs the airway
- 3 S's *Symptoms occur at night*
  - ➡ **S**tridor
  - ➡ **S**ubglottic swelling (causes hoarseness in the voice)
  - ➡ **S**eal-bark cough

	CROUP	EPIGLOTTITIS
ONSET	**Sudden (at night)**	**Rapid (within hours)**
FEVER	**Fluctuating**	**High**
COUGH	**Yes**	**No**
DYSPHAGIA	**No**	**Yes**
CAUSE	**Viral**	**Bacterial**
EMERGENCY	**Not typically**	**Yes**

TREATMENT

HOME CARE

Self-limiting
(Usually resolves on its own)

- Corticosteroids (↓ inflammation)
- Racemic epinephrine
- Humidified air
  (steamy bathroom or mist humidifier)
- Encourage rest & fluid intake
- Calm environment for the child

SEEK HELP

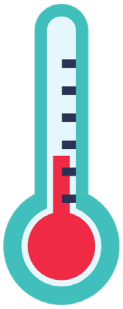
When the child is indicating
respiratory distress

- Child is confused/restless
- Blue lips/nails
- ↑ respiration rate
  (breathing faster, but less air is going in)
- Retractions
- Nasal flaring
- Drooling/can't swallow

FEVER MANAGEMENT

NORMAL TEMP

97.5°F to **98.6°F**
36.4°C to **37.0°C**



FEVER

> 100.4°F (38.0°C)

SIGNS & SYMPTOMS

- Flushed skin
- Diaphoresis (sweating)
- Chills
- Restlessness
- Lethargy

TREATMENT

- Administer antipyretics (ibuprofen) → Do not administer aspirin (risk for Reye's Syndrome)
- Monitor for S&S of dehydration & electrolyte imbalances → Provide adequate fluids!
- Sponge bath → Tepid water for 20-30 min. Squeeze over back & body
- Remove excess clothing & coverings to ↓ the temp
- Cool compress on the forehead

FEBRILE SEIZURE

WHAT IS IT?

Seizures associated with a **FEVER**

Not related to:

- ➥ intracranial infection
- ➥ metabolic imbalance
- ➥ viral illness

Usually **DOES NOT** have long term complications such as epilepsy or intellectual disability

SIGNS & SYMPTOMS

- Rapid ↑ in core temperature
- Child may be drowsy during postictal period

RISK FACTORS

- 6 months - 5 years
- Rapidly developed fever
- HIGH fever
- Family history of febrile seizures
- Certain vaccines
    - ➥ DTP & MMR

TREATMENT

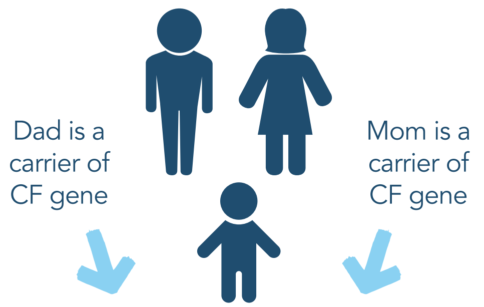
- NOT anticonvulsants therapy
- Rectal Diazepam
- Educate the parents to seek help if...
    - ➥ Last > 5 min
    - ➥ Repeated seizures

CYSTIC FIBROSIS (CF)

PATHO

- Multisystem disorder of the **EXOCRINE GLANDS** with increased production of thick mucus
- Gene mutation (CFTR): prevents exocrine glands from properly functioning
- **EXOCRINE GLANDS**: Produce & transfer secretions (mucus, tears, sweat, & enzymes) via ducts
- ↑ viscosity of mucous = ↑ resistance to ciliary action = slowing the flow rate of mucous, leading to **mucous plugging**

CF IS AN **AUTOSOMAL RECESSIVE** GENETIC DISORDER



2 mutated CF genes = **CYSTIC FIBROSIS**

DIAGNOSIS

- Ambry test
- Positive sweat sodium chloride test
- Genetic screen

TREATMENT

- **Treatment of the mucous**
  - ➥ Chest physiotherapy (PT)
  - ➥ Postural drainage
  - ➥ Huff coughing
  - ➥ Nebulizers
    Bronchodilators, mucolytics, anti-inflammatories
- **Treat & prevent infection**
  - ➥ Wear a mask, hand washing, up-to-date on vaccines, avoid those who are sick.

- **Nutrition**
- **Prevent GI blockage**
  - ➥ Fluids & stool softeners

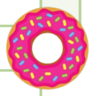
CHEST PT

- Drains airways of thick mucous to be coughed up
  - ➥ Stimulates cough
  - ➥ Helps loosen mucous
  - ➥ Results in deep breathing
  - ➥ Builds up strength and endurance of respiratory muscles
  - ➥ Improves cardiovascular fitness

- Done multiple times a day between 1-2 hour increments
  - ➥ NOT done right before or after meals!
- Causes vibrations & percussions to break apart the mucus (vests, manual vibration)

- ↑ protein, ↑ fat, ↑ calorie
  - ➥ Fat soluble vitamin supplementation A, K, E, D

All Kids Eat Donuts



- Possible supplemental oral feeding or enteral feeding
- **Pancreatic enzymes**:
  - ➥ Pancrelipase or Pancreatin
  - ➥ Can swallow a capsules or sprinkle enzymes on foods that are acidic such as apple sauce!

MANIFESTATIONS OF CF

RESPIRATORY

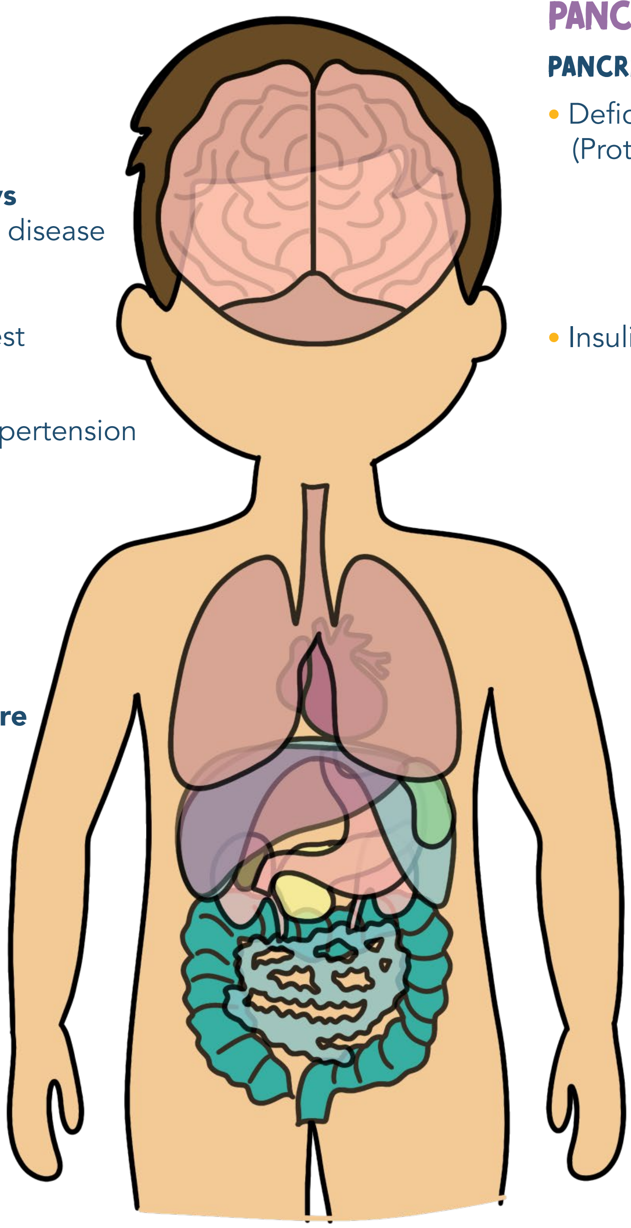
- **INFECTION:** Thick mucous creates a great environment for bacterial growth
    - ➥ Pseudomonas
    - ➥ Staph. aureus
- Pneumonia
- Bronchitis
- **Thick mucus** = **blocked airways**
    - ➥ Obstructive pulmonary disease (Emphysema)
        - Clubbing
        - Barrel-shape chest
- Pneumothorax
- Strain on lungs = pulmonary hypertension

CARDIOVASCULAR

- Pulmonary hypertension puts strain on the heart
    - ➥ **Right-sided heart failure**

INTEGUMENTARY

- Sweat glands produce ↑ chloride = salty skin
- Salty sweat & salty tears which leads to
    - ➥ Dehydration
    - ➥ Electrolyte imbalance



NOSE & SINUSES

- Sinusitis
- Nasal polyps (snoring, stuffiness)

PANCREAS

PANCREAS SECRETES THICK MUCUS

- Deficient in pancreatic enzymes: (Protease, Amylase, Lipase)
    - ➥ Weight loss
    - ➥ Inadequate protein absorption
    - ➥ Deficiency of protein
    - ➥ Failure to thrive
- Insulin deficiency
    - ➥ Hyperglycemia
    - ➥ CF-related diabetes

LIVER

- Bile duct blocked from **THICK** mucus
    - ➥ Gallstones
    - ➥ Biliary cirrhosis

STOMACH & INTESTINES

- Fecal impaction
- Rectal prolapse
- Bowel obstruction
- Intussusception
- Back up of stool in intestine
    - ➥ Constipation
    - ➥ Vomiting
    - ➥ Abdominal distention
    - ➥ Cramping
    - ➥ Anorexia
    - ➥ RLQ pain
- Meconium ileus in infants
- Steatorrhea
    - ➥ Frothy (bulky), fatty, foul-smelling stools

REPRODUCTIVE

BOYS

- Thick mucus blocks the vas deferens = Infertility

GIRLS

- Thick cervical mucus blocks sperm from penetrating = Infertility

BOTH HAVE DELAYED PUBERTY

FETAL CIRCULATION IN UTERO

FORAMEN OVALE

Blood is *SHUNTED* from the right atrium to the left atrium by the **FORAMEN OVALE**

Blood bypasses the lungs...why?

It's already oxygenated blood from the placenta (mom)

RIGHT ATRIUM

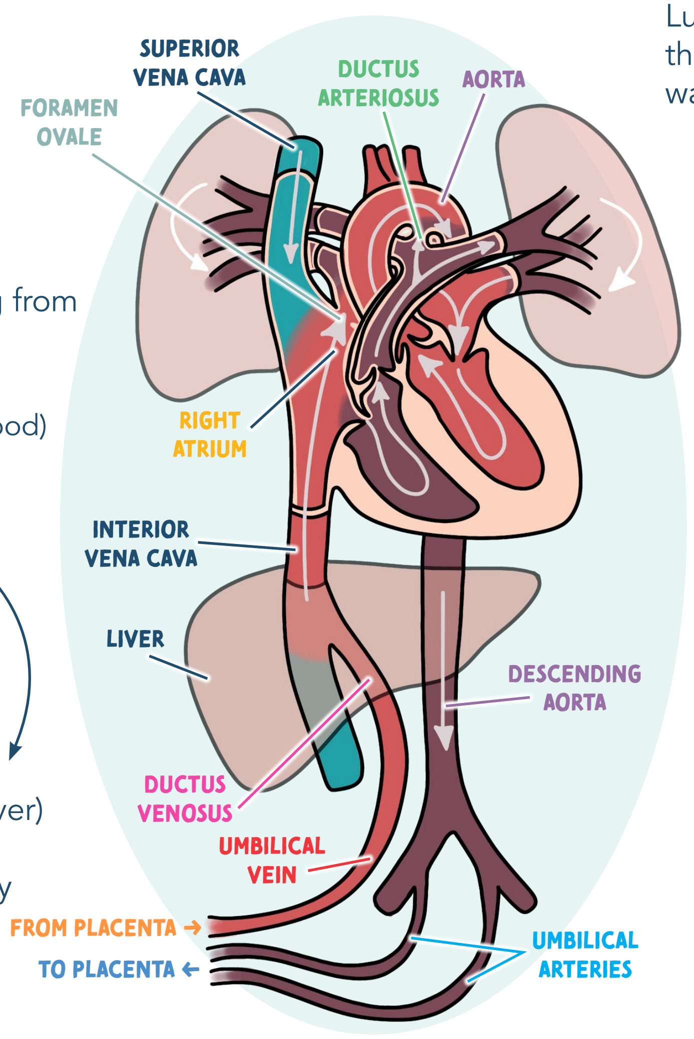
Blood goes from the interior vena cava to the right atrium as well as some deoxygenated blood coming from the **SUPERIOR VENA CAVA**.

So the blood is now MIXED (oxygen-rich & oxygen-poor blood)

Liver not fully functioning yet

DUCTUS VENOSUS

Umbilical vein is carrying oxygenated blood from the placenta. It passes the **LIVER** (Some blood will go to the liver) but most will be *SHUNTED* to the **INFERIOR VENA CAVA** by the **DUCTUS VENOSUS**


SUPERIOR VENA CAVA
DUCTUS ARTERIOSUS
AORTA
FORAMEN OVALE
RIGHT ATRIUM
INTERIOR VENA CAVA
LIVER
DESCENDING AORTA
DUCTUS VENOSUS
UMBILICAL VEIN
FROM PLACENTA →
TO PLACENTA ←
UMBILICAL ARTERIES

How can blood be shunted from the right atrium to the left atrium?

PRESSURE DIFFERENCE!

Blood flows from *high resistance* to *low resistance.*

Lungs: High resistance from all the fluid. So the blood does not want to go in the lungs!

DUCTUS ARTERIOSUS

Blood is *SHUNTED* from the pulmonary artery into the aorta by the ductus arteriosus

AORTA

Mixed blood is now in the aorta and being pushed out to oxygenate the fetus

BLOOD GOES BACK TO THE PLACENTA TO GET OXYGENATED AGAIN!

THE PLACENTA IS THE "LIFELINE" BETWEEN MOTHER & BABY

START

The Placenta is like "TEMPORARY LUNGS" for the fetus while in utero

2 UMBILICAL ARTERIES

A think **AWAY**

Takes deoxygenated blood + waste **AWAY** from the baby back to the placenta

1 UMBILICAL VEIN

Gives oxygen rich blood **TO** the baby

SHUNTS TO KNOW

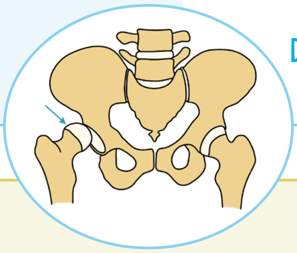
- ✷ DUCTUS VENOSUS
- ✷ FORAMEN OVALE
- ✷ DUCTUS ARTERIOSUS

DEVELOPMENT DYSPLASIA OF THE HIPS (DDH)

PATHO

- Abnormal development of the hip joint
- A baby's bones are not ossified yet so they have the ability to dislocate & relocate easily

DISLOCATION	No contact between femoral head & acetabulum
SUBLUXATION	Partial dislocation (acetabulum is not completely in contact with the hip joint)
DYSPLASIA	Hip joint doesn't have the proper shape to fit together correctly

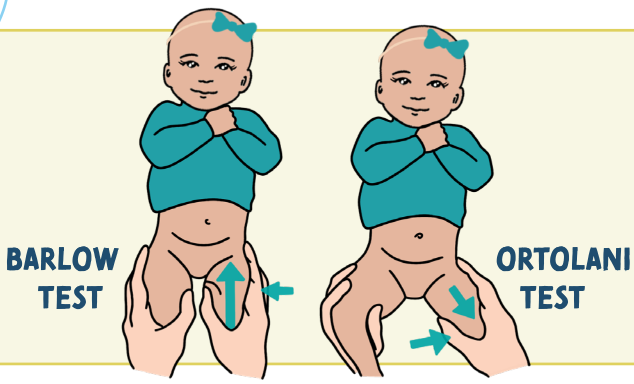


DIAGNOSIS

- Ultrasound for in utero
- X-ray for those older than 6 months
- Barlow test & Ortolani

Listen for any noises during the exam. There should be no "clunks" heard or felt.

If "clunks" are felt or heard = a positive sign for DDH



COMPLICATIONS

- Avascular necrosis of the femoral head
- ↓ ROM
- Leg-length discrepancy
- Early osteoarthritis
- Femoral nerve palsy

RISK FACTORS

- FEMALE → more lax ligaments from maternal hormones
- Breech positioning
- Oligohydramnios

TREATMENT

Early detection & treatment are crucial. The bones are not ossified in early infancy, so you want to manipulate them to grow properly. If DDH is not treated early the bones will ossify and develop incorrectly.

> 6 MONTHS

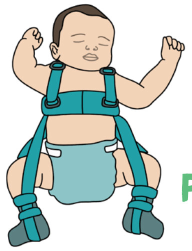
- **Pavlik harness**: Stabilizes the hip by preventing hip extension

4 MONTHS - 2 YEARS

- **Closed reduction**:
  - Requires general anesthesia where the hips will be placed back into the acetabulum by the surgeon
  - Spica cast is worn after surgery to maintain reduction
  - After spica cast the child will wear a brace until acetabulum is fully normal

> 2 YEARS OR NO IMPROVEMENTS WITH SURGERY OR HARNESS

- Open surgical reduction followed by casting



INSTRUCTIONS FOR PAVLIK HARNESS

- Must wear the harness at all times!
- Do not adjust the straps or remove harness until instructed by the HCP
- Change the diaper while the baby is in the harness
- Check for redness, irritation or breakdown 2-3 times per day
- Place baby on their back to sleep
- Place long knee socks and undershirt to prevent rubbing of the harness

SCARLET FEVER

PATHO

SCARLET FEVER
THINK STREP!

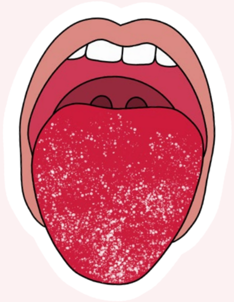
- Complication of **group A streptococcal infection** AKA **Strep throat**
- Not all children who have strep will develop scarlet fever
- TRANSMISSION: Droplets & respiratory tract secretions.
  Transmission happens in close contact such as schools & daycares.

SIGNS & SYMPTOMS

- Onset: ABRUPT!
- RED RASH!
  - ➥ Sandpaper-like rash
- Pharyngitis
- Fever, body aches, chills
- Strawberry tongue
- Tender cervical nodes
- Tonsils are red
- Exudate may be present

Begins on the NECK & CHEST and spreads outwards to THE EXTREMITIES!

Rash is usually not seen on the palms & soles of the feet



S's OF SCARLET FEVER
- **Strawberry tongue**
- **Sandpaper rash**

COMPLICATIONS

- Rheumatic fever
- Glomerulonephritis
- Abscesses of the throat
- Pneumonia

Early diagnosis & treatment are very important to prevent complications!

TREATMENT

Most children can be cared for at home

- Antibiotics (Penicillin V)
  - ➥ Erythromycin for those allergic to Penicillin
- Fluids & soft foods
- Provide comfort
- Cool mist humidifier

Take antibiotics as directed.... Finish the medication even if the child appears to be better!

SOUPS, TEAS, POPSICLES, SLUSHIES

MED-SURG

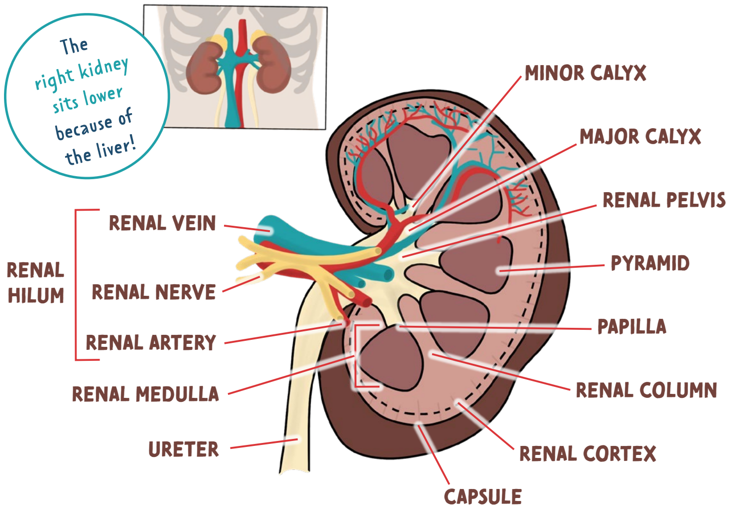
RENAL/URINARY SYSTEM

KIDNEY OVERVIEW

FUNCTIONS

- **A**CID-BASE BALANCE
- **W**ATER BALANCE
- **E**LECTROLYTE BALANCE
- **T**OXIN REMOVAL
- **B**LOOD PRESSURE CONTROL
- **E**RYTHROPOIETIN
- VITAMIN **D** METABOLISM

ANATOMY OF THE KIDNEY


The right kidney sits lower because of the liver!

TERMS TO KNOW

DYSURIA	Pain while urinating
NOCTURIA	Excessive urination at night
HEMATURIA	Bloody urine
FREQUENCY	Voiding more than every 3 hours
URGENCY	Strong desire to void
INCONTINENCE	Involuntary voiding
ENURESIS	Involuntary voiding during sleep
PROTEINURIA	Abnormal amounts of protein in the urine
OLIGURIA	Urine output: <400 mL/day
ANURIA	Urine output: <50 mL/day
MICTURITION	Voiding

URINE FORMATION

1 GLOMERULAR FILTRATION

Blood flows into the kidneys: **120 mL/min**

Filters water, electrolytes, & small molecules **into the glomerulus** (Large molecules stay in the bloodstream)

2 TUBULAR REABSORPTION

Fluid moves **from renal tubules into the capillaries**. They reabsorb fluid into the venous circulation.

3 TUBULAR SECRETION

Fluid moves **from the capillaries into the renal tubules** to get eliminated/excreted.

4 URINE EXCRETION

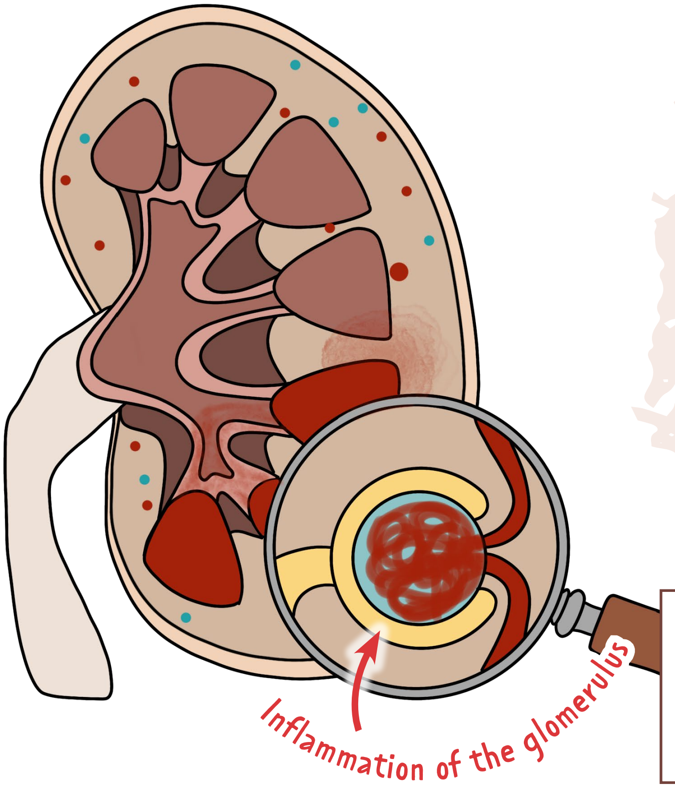
Adults should void 1-2 L/day
No less than 30mL/hr

LAB VALUES RELATED TO THE KIDNEYS

You will see **INCREASED** BUN & Creatinine levels during kidney injury/failure

GFR	**Glomerular Filtration Rate:** rate of blood flow through the kidneys.	90 - 120 ML/MIN
BUN	**Blood Urea Nitrogen:** Normal waste product resulting from the breakdown of proteins. ↑ Levels can indicate a kidney problem & be toxic in the body.	7 - 20 MG/DL
CREATININE	End product of muscle metabolism solely filtered from the blood via glomerulus	0.6 - 1.2 MG/DL
URINE SPECIFIC GRAVITY	Measures the kidney's ability to excrete or conserve water	1.010 - 1.030
CREATININE CLEARANCE	The amount of blood the kidneys makes per minute that is FREE of creatinine	FEMALE: 85 - 125 ML/MIN MALES: 95 - 140 ML/MIN

ACUTE GLOMERULONEPHRITIS (POSTSTREPTOCOCCAL)



PATHOLOGY

1. Untreated strep
2. Immune system response by creating **antigen-antibody complexes** (14 days after infection)
3. These antibodies get "lodged" in the glomeruli
4. Inflammation & scarring
5. ↓ GFR

It's not the strep that causes the inflammation of the kidneys.

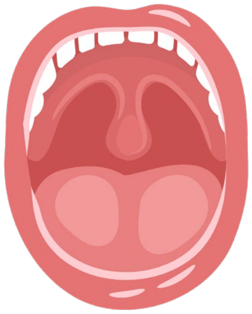
It's the **antigen-antibody complexes** that form due to the strep that causes the inflammation & damage to the glomeruli

SIGNS & SYMPTOMS

- Hematuria → Blood in the urine
- Azotemia → Excessive nitrogenous waste in the blood
- Malaise
- Headache
- Proteinuria (mild)
- Hypoalbuminemia
- ↓ GFR = Oliguria

Tea colored urine (cola color)

- Edema
    - Swelling in the face/eyes
- ↑ Blood pressure
- Retaining sodium
- ↑ Urine specific gravity
- ↑ BUN & creatinine
- (+) ASO (Antistreptolysin) Titer



MAIN CAUSE:
RECENT GROUP A BETA-HEMOLYTIC STREPTOCOCCAL INFECTION

INTERVENTIONS

- Fix the cause! (strep)
- Diet modifications
    - Fluid restriction
    - Sodium restriction
    - ↓ Protein
    - Provide a lot of carbohydrates

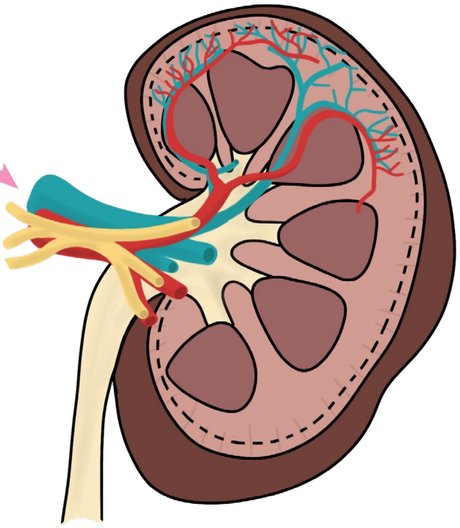
Carbohydrates provide energy & stop the breakdown of protein

- Monitor
    - Daily intake & output
    - Daily weight → A weight gain of 1 kg is equal to 1,000 mL of retained fluid
- Bed rest
- Monitor blood pressure
    - Antihypertensives
    - Diuretics

ACUTE KIDNEY INJURY (AKI)

WHAT IS IT?

Sudden renal damage! Causes a build-up of waste, fluid, and electrolyte imbalance.
It can be reversible. Formerly called *Acute Renal Failure*.



PRERENAL FAILURE

Damage **BEFORE** the kidneys

↓ VOLUME/PERFUSION TO THE KIDNEYS

- **Cardiac damage**
  - ↓ or impaired cardiac output
  - Examples: MI
- **Vasodilation**
- **Hemorrhage** (hypovolemia)
- **Burns**
- **GI losses** (vomiting/diarrhea)

INTRARENAL FAILURE

Damage **IN** the kidneys

PROLONGED ISCHEMIA

- **Myoglobinuria**
- **Hemoglobinuria**
- **Rhabdomyolysis**
- **Nephrotoxic drugs**
  - Examples: NSAIDs, antibiotics (aminoglycosides), chemo drugs, contrast dyes
- **Infections**
  - Examples: Glomerulonephritis

POSTRENAL FAILURE

Damage **AFTER** the kidneys

OBSTRUCTION/BLOCKAGE IN THE URINARY TRACT

- **Renal calculi (stones)**
- **Blood clots**
- **Benign prostatic hyperplasia (BPH)**
- **Tumors**
- **Neuro damage (stroke)**

PHASES "OH OH DARN RENAL"			INTERVENTIONS
OH	**ONSET / INITIATION** →	Triggering event *(Prerenal, Intrarenal or Postrenal Failure)*	Correct & identify the underlying cause to prevent long term damage to nephrons!
OH	**OLIGURIC** →	↓ Urine output < 400 mL/24 hrs Glomerulus decreases the ability to filter blood (↓ GFR)	Low protein diet Limit fluid intake Strict I&O + daily weights Monitor EKG & labs • Watch for HYPERkalemia > 5.0 • ↑ BUN & Creatinine Dialysis may be needed until kidney function returns
DARN	**DIURETIC** →	Cause of AKI is corrected Gradual ↑ in urinary output	Large amount of dilute urine with electrolytes Monitor the patient for dehydration & hypokalemia
RENAL	**RECOVERY** →	↑ in kidney function May take up to 6 - 12 months	Some patients may never recover and may develop chronic kidney disease (CKD)

NEPHROTIC SYNDROME

PATHOLOGY

INFLAMMATORY RESPONSE IN THE GLOMERULUS

↓

DAMAGE TO MEMBRANE

↓

LOSS OF PROTEIN (ALBUMIN)

Albumin regulates oncotic pressure

↓

HYPOALBUMINEMIA

LOW ALBUMIN LEVELS

- **CAUSES SYNTHESIS OF CHOLESTEROL & TRIGLYCERIDES** ↓ **HYPERLIPIDEMIA**
- **FLUID SHIFT** ↓ **GENERALIZED EDEMA**
- **ALBUMIN IS A PROTEIN WHICH PREVENTS CLOT FORMATION** ↓ **POSSIBLE BLOOD CLOTS (THROMBOSIS)**
- **CAN LOSE PROTEIN THAT HELPS FIGHT INFECTIONS** (Immunoglobulins) ↓ **RISK FOR INFECTION**

CAUSES

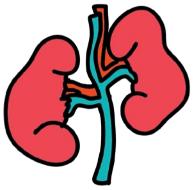
- Bacteria or viral infection
- Cancer
- Genetic predispositions
- Systemic disease (lupus or diabetes)
- NSAIDs

SIGNS & SYMPTOMS

- Hypoalbumenia
  - Edema
  - Fatigue & loss of appetite
  - Hyperlipidemia
- Proteinuria (> 3 g/day)
  - Large amounts of protein in the urine

INTERVENTIONS

- Monitor fluid status
  - Daily weights & I&O's
  - Swelling & abdominal girth
- Diet modifications
  - ↓ Cholesterol & saturated fats
  - ↓ Na+ intake
  - Moderate protein intake
- Medications
  - Diuretics
  - Statins (lipid-lowering drugs)
  - Prednisone to ↓ inflammation
  - Antineoplastic agent
  - Immunosuppressant
- Monitor signs of...
  - Infection
  - Blood clots



CHRONIC KIDNEY DISEASE (CKD)

PATHO

- Progressive & irreversible loss of kidney function.
- Occurs over a long period of time.

CAUSES

- Untreated acute kidney injury (AKI)
- Diabetes mellitus
- Hypertension
- Family history
- Recurrent infections
- Autoimmune disorders

STAGES

Stages are based on the GFR rate

AS CKD WORSENS... GFR DECREASES ↓

	GFR
STAGE 1	> 90
STAGE 2	60 - 89
STAGE 3	A: 45 - 59 B: 30 - 44
STAGE 4	15 - 29
STAGE 5	< 15

(END STAGE RENAL DISEASE) ⚠

TREATMENT

- Dialysis
- Kidney transplant

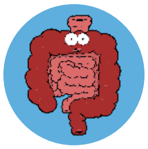
SIGNS & SYMPTOMS

In the end stages of CKD,
ALMOST EVERY BODY SYSTEM is negativity affected

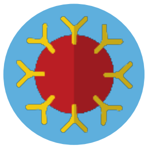
- ↓ Urinary output (UOP)
  - Oliguria = <400 mL/day
  - Anuria = <100 mL/day
- Proteinuria & hematuria

- Lethargy
- Altered LOC/confusion
- Seizures

- Hypertension
- Fluid volume excess (Hypervolemia)
- Heart failure



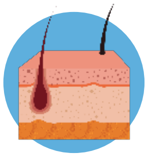
- Anorexia
- Nausea/vomiting
- Uremic fetor (ammonia breath)
- Metallic taste



- Impaired immune & inflammatory response

- Anemia (↓ erythropoietin [EPO])
- ↑ Risk for bleeding
- Prolonged bleeding time

- Amenorrhea
- Erectile dysfunction
- ↓ Libido



- Uremic frost
- Pruritus

LABS

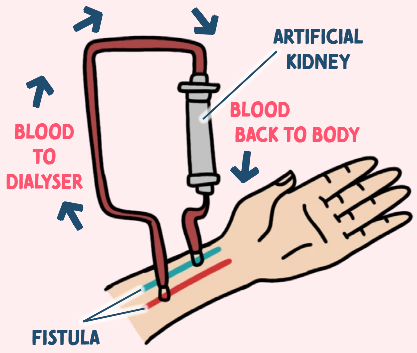
- ↑ BUN
- ↑ Creatinine
- ↑ K+
- ↑ Magnesium
- ↓ Calcium
- ↑ Phosphate

TYPES OF DIALYSIS

HEMODIALYSIS

MOST COMMON METHOD

3X a week (3 - 5 hours per treatment)



THE DIALYZER

(Artificial kidney)

↓

Brings blood to the dialyzer

↓

Filters out toxins/waste products

↓

Brings clean blood back to the body

VASCULAR ACCESS

FISTULA	GRAFT
Joining an artery to a vein	Inserting synthetic graft material between an artery and vein
	Needs time to heal and mature

BOTH REQUIRE SURGERY

EVALUATION OF PATENCY

✔ Feel the thrill...

✔ Hear the bruit...

COMPLICATIONS

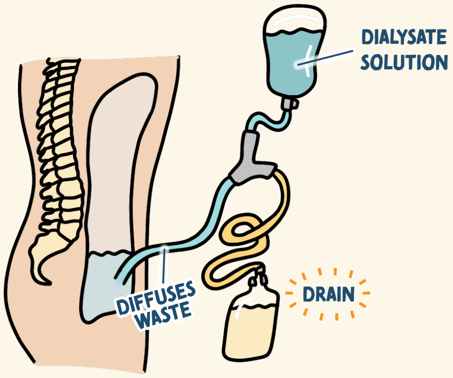
- Hypotension
- Disequilibrium syndrome
- Hemorrhage
- Air embolus
- Electrolyte imbalances

AVOID...

- ✗ Compression
- ✗ Blood draws
- ✗ Blood pressure readings
- ✗ Tight clothing
- ✗ Carrying bags
- ✗ Sleeping on that arm

PERITONEAL DIALYSIS

INSIDE THE BODY



Warm the solution!

↓

Dialysate is infused into the peritoneal cavity by gravity

↓

Close the clamp on the infusion line

↓

Dialysate dwells for a set amount of time (dwell time)

↓

The drainage tube is unclamped

↓

Fluid drains from the peritoneal cavity by gravity

↓

A new container of dialysate is infused as soon as drainage is complete

↓

REPEAT!

PERITONEAL CATHETER

Performed at the bedside or in the operating room

COMPLICATIONS

- Peritonitis (infection)
  - Cloudy or bloody drainage
  - Fever
  - Abdominal pain
  - Malaise

URINARY TRACT INFECTION

PATHO

Infection within the urinary system caused by either a **BACTERIA**, **VIRAL**, or **FUNGUS**.

BACTERIA IS MOST COMMON **SPECIFICALLY E.COLI**

CAUSES

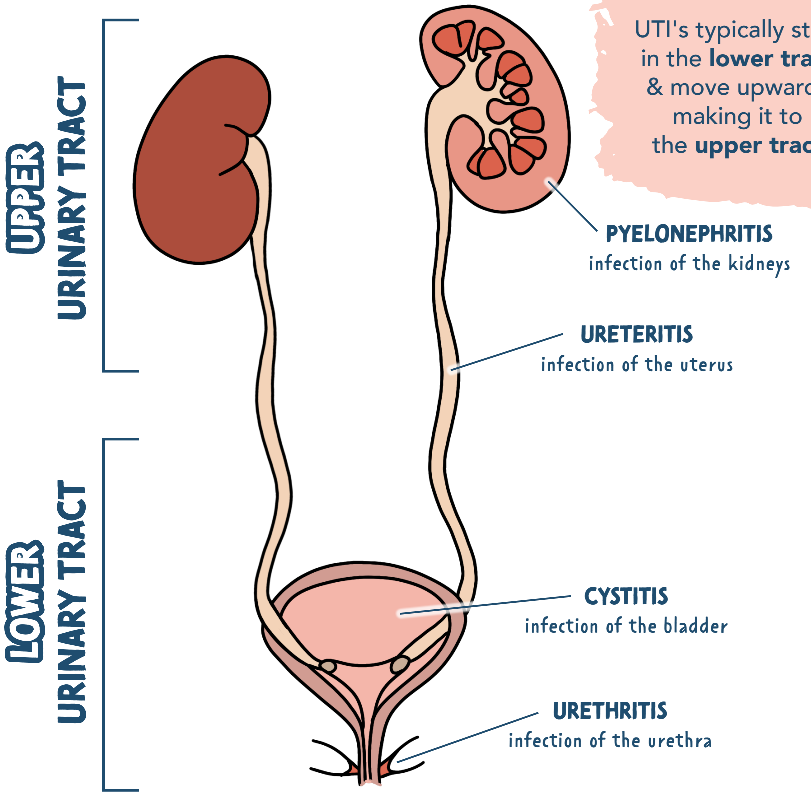
- Most common in women (shorter urethra & urethra is close to the rectum)
- Overuse of antibiotics
- Indwelling catheters
- Hormone changes (pregnancy changes)
- Diabetes
- Lifestyle
  - Baths, scented tampons, perfumes etc.

EDUCATION

- Take entire antibiotics course
- Wipe from front to back
- Void after intercourse
- Avoid caffeine & ETOH
- Void frequently
- Avoid bubble baths, perfumes, or sprays!
- Wear non-tight cotton underwear

NURSING CONSIDERATIONS

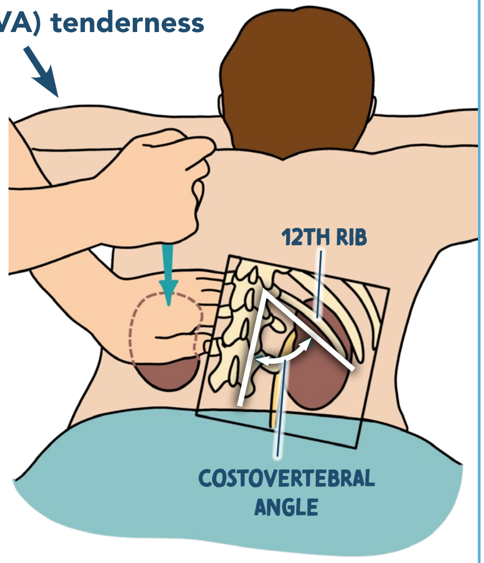
- Maintain fluid status → "flushing" out the urinary tract
  - 2 - 3 L per day
  - Remove the catheter ASAP (per HCP order)
- Medications
  - Antibiotics → Take urine culture BEFORE giving first dose of antibiotics
  - Analgesia (control pain)
  - Phenazopyridine (Pyridium) → Analgesic to ↓ pain **May turn urine orange**


UPPER URINARY TRACT
LOWER URINARY TRACT
PYELONEPHRITIS
infection of the kidneys
URETERITIS
infection of the uterus
CYSTITIS
infection of the bladder
URETHRITIS
infection of the urethra

UTI's typically start in the **lower tract** & move upwards making it to the **upper tract**

SIGNS & SYMPTOMS

- Smelly urine
- Chills & fever
- **Costovertebral angle (CVA) tenderness**
- Nausea & vomiting
- Headache/malaise
- Painful urination (dysuria)
- Burning on urination
- Frequency & urgency
- Nocturia
- Incontinence
- Hematuria
- Fever
- WBC's in the urine


12TH RIB
COSTOVERTEBRAL ANGLE

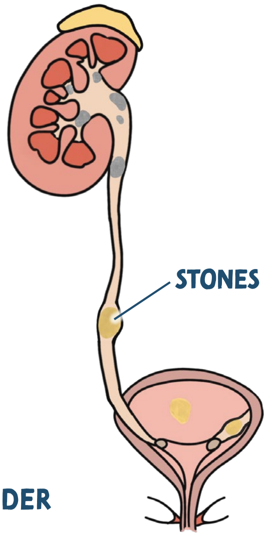
ELDERLY CLIENTS MAY SHOW DIFFERENT SYMPTOMS →

- Confusion
- Lethargy
- New incontinence

RENAL CALCULI

PATHO

Stones (calculi) found in the urinary tract & kidney!



NEPHROLITHIASIS:
stones in the **kidneys**

URETEROLITHIASIS:
stones in the **ureter**

- Stones can be very large *or* very small
- They can be found inside the **KIDNEYS**, **URETERS**, or the **BLADDER**

TREATMENT

MOST COMMONLY, THE STONE WILL PASS ON IT'S OWN!

- **MEDICATIONS** to control the *PAIN*
  - NSAIDs
  - Opioids analgesics

↓ **Pain & inflammation**
(makes the stone easier to pass)

- **STRAIN THE URINE**
  - keep any stones & send them to the lab to evaluate the type of stone
- **GET THEM MOVING OR FREQUENTLY TURNING THEM!**
- **↑ FLUIDS!**

Push stone forward & out!
Decreases risk of infection

- **DIET**
  - Limit protein, NA+ foods, & calcium
- **PROCEDURES:**

NONINVASIVE **Extracorporeal Shock Wave Lithotripsy (ESWL)**
Sends shock waves to break up the stone!

INVASIVE! **Percutaneous Nephrolithotomy**
Stone removed by an incision made on the back where the kidneys are located.

SIGNS & SYMPTOMS

- **PAIN!**
- Discomfort
- Hematuria → (RBC's)
- Pyuria → (WBC's)
- Nausea & vomiting

DIAGNOSIS

- KUB: X-ray of kidneys, ureters, bladder
- IVP: intravenous pyelogram
- Ultrasound or CT scan
- Urine test

What is URIC ACID?
Uric acid is a waste products of the breakdown of **purines**

MOST COMMON!

RARE!

	CALCIUM	URIC ACID	STRUVITE	CYSTINE
STONE TYPE	Forms due to ↑ amounts of calcium & oxalate in the urine	Too much uric acid in the urine (acidic urine)	Persistent alkaline environment that is ammonia-rich urine Due to a **bacteria**	Rare, genetic, inherited disorder that affects renal absorption of cystine
CAUSES	Hypercalcemia Hypercalciuria Hyperparathyroidism ↑ Intake of Na+ Dehydration GI disorders ↑ Intake of calcium supplements with vit D	Gout Foods high in purine or animal proteins Dehydration Metabolic issues (Diabetes)	Chronic urinary tract infections (UTI's) Foreign bodies Neurogenic bladder	

MED-SURG

CARDIAC SYSTEM

CARDIAC TERMS

CARDIAC OUTPUT (CO)

Total volume pumped per minute

Normal 4 - 8 L/min

Less volume = ↓ CO
More volume = ↑ CO

CO = HR x Stroke Volume

Cardiac Output *Heart Rate*

↓ CO = ↓ perfusion to the body

- ↓ LOC
- Lungs sound wet due to backflow
- Shortness of breath
- Skin will be cold & clammy
- ↓ UOP
- Weak peripheral pulses

STROKE VOLUME

Amount of blood pumped out of the ventricle with each beat or contraction

CONTRACTILITY

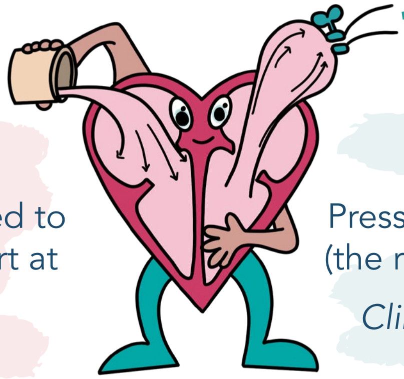
Force / strength of contraction of the heart muscle

EJECTION FRACTION (EF)

% of blood expelled from the left ventricle with every contraction

Normal EF: 50 - 70%

EXAMPLE:
If the EF is 55%, the heart is pumping out 55% of what's inside of the left ventricle



PRELOAD

Amount of blood returned to the right side of the heart at the end of diastole

AFTERLOAD

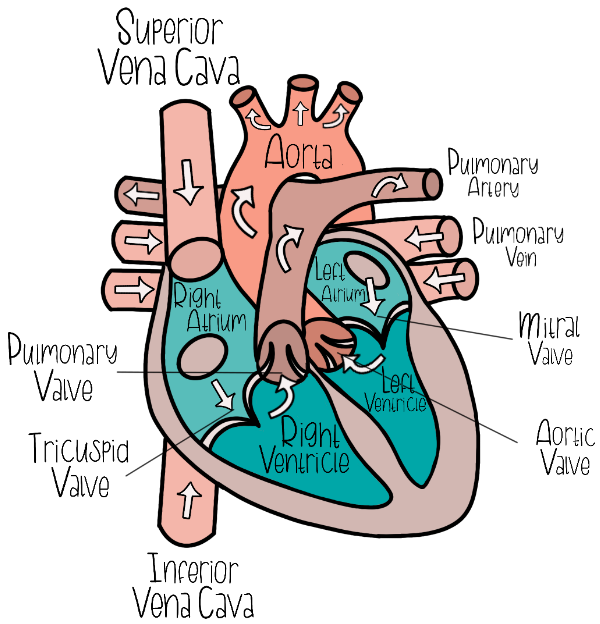
Pressure that the left ventricle has to pump against (the resistance it must overcome to circulate blood)

Clinically measured by systolic blood pressure!

HEMODYNAMIC PARAMETERS

Cardiac output (CO)	Total volume pumped per minute	**Normal 4 - 8 L/min**
Cardiac Index (CI)	Cardiac output per body surface area $CI = \frac{CO}{\text{surface area}}$	**2.5 – 4.0 L/min/m^2**
Central Venous Pressure (CVP)	Pressure in the superior vena cava. Shows how much pressure from the blood is returned to the right atrium from the superior vena cava.	**2 – 8 mmHg**
Mean Arterial Pressure (MAP)	Average pressure in the systemic circulation (*your body*) through the cardiac cycle	**70 – 100 mmHg** *At least 60 mm Hg is require to adequately perfuse the vital organs*
Systemic Vascular resistance (SVR)	The **resistance** it takes to push blood through the circulatory system to create blood flow	**800 – 1200 dynes/sec/cm**

FLOW OF BLOOD THROUGH THE HEART


Superior Vena Cava
Aorta
Pulmonary Artery
Pulmonary Vein
Left Atrium
Right Atrium
Mitral Valve
Pulmonary Valve
Left Ventricle
Aortic Valve
Right Ventricle
Tricuspid Valve
Inferior Vena Cava

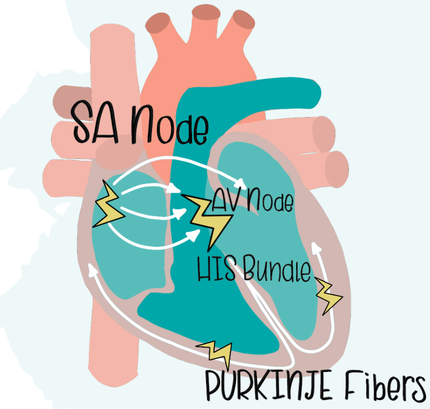
RIGHT SIDE	LEFT SIDE
Deoxygenated Blood	Oxygenated Blood
Carries oxygen poor blood ***from the body*** back to the right side of the heart	Oxygenated blood ***from the lungs***
1. Superior / Inferior Vena Cava	**7. Pulmonary Vein**
2. Right Atrium	**8. Left Atrium**
3. Tricuspid Valve	**9. Bicuspid / Mitral Valve**
4. Right Ventricle	**10. Left Ventricle**
5. Pulmonic Valve	**11. Aortic Valve**
6. Pulmonary Artery	**12. Aorta**
DEOXYGENATED BLOOD TO THE LUNGS	**OXYGENATED BLOOD TO THE BODY**

VASCULAR SYSTEM FACTS

ARTERIES - Carry oxygenated blood to tissues → (think **A**way from the heart)

VEINS - Carry deoxgenated blood back to the heart

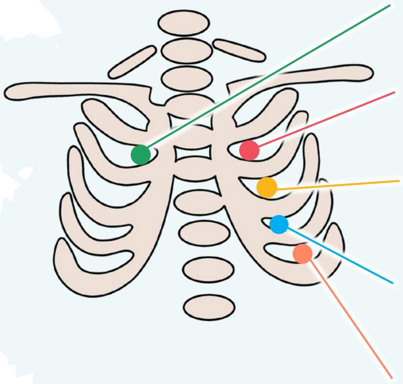
Electrical Conduction of the Heart


SA Node
AV Node
HIS Bundle
PURKINJE Fibers

MNEMONIC	
Send	**SA Node** ↓
A	**AV Node** ↓
Big	**Bundle of His** ↓
Bounding	**Bundle Branches** ↓
Pulse	**Purkinje Fibers**

AUSCULTATING HEART SOUNDS

5 Areas for Listening to the Heart



All People Enjoy Time Magazine

Aortic
Right 2nd intercostal space

Pulmonic
Left 2nd intercostal Space

ERB's Point
(S1, S2) Left 3rd intercostal space

Tricuspid
Lower left sternal border 4th intercostal

Mitral
Left 5th intercostal, medial to midclavicular line

TIP

Think **M** for **M**idclavicular &
Mitral has 5 letters for "5th intercostal space"

NORMAL

S1
LUB
Tricuspid & mitral valve closure

↓

S2
DUB
Aortic & pulmonic valve closure

***Closing* of the valves**
Valve opening does not normally produce a sound

ABNORMAL

S3 **EARLY DIASTOLE** in rapid ventricle filling

↓

S4 **LATE DIASTOLE** & high atrial pressure (forcing blood into a stiff ventricle)

Abnormal ventricular filling
Extra ❤ sounds

SYSTOLE: Ventricle pump / ejection = *LUB (S1)*

DIASTOLE: Ventricle relax / filling = *DUB (S2)*

Memory Trick

"COZY RED"

CO *(contract)* **ZY** *(systole)*
RE *(relax)* **D** *(diastole)*

EKG WAVEFORMS

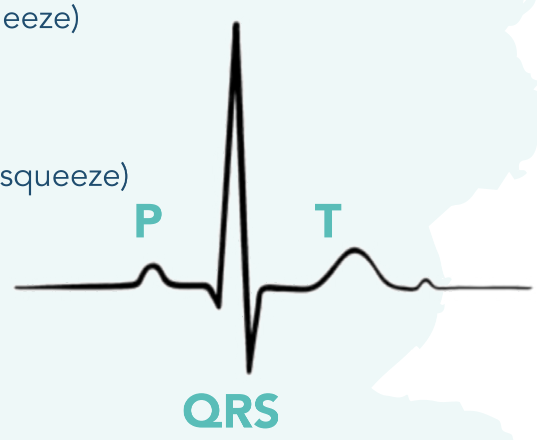
SIGNS & SYMPTOMS

PQRST

P
Atrial contraction (squeeze)
DE-polarization
DE-compressing

QRS COMPLEX
Ventricle contraction (squeeze)
DE-polarization
DE-compressing

T
Ventricles
RE-laxing
RE-polarizing
RE-filling with blood



PR INTERVAL

Movement of electrical activity from atria to ventricles

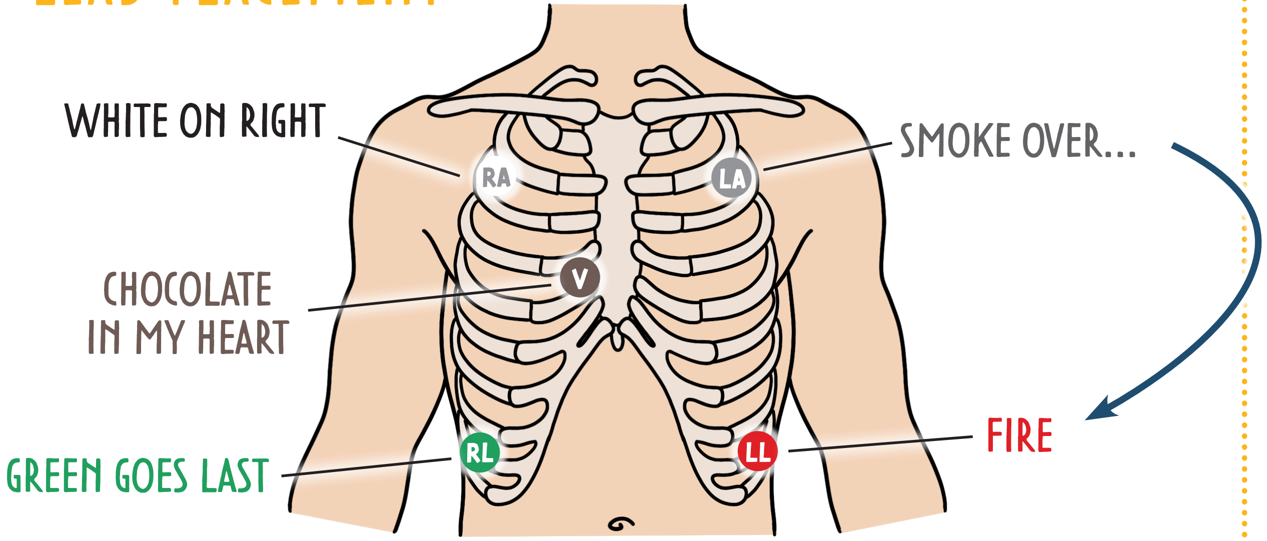
ST SEGMENT

Time between ventricular de-polarization and repolarization *(ventricular contraction)*

QT INTERVAL

Time take from ventricles to depolarize, contract, and repolarize

5-LEAD PLACEMENT


WHITE ON RIGHT
RA
SMOKE OVER...
LA
CHOCOLATE IN MY HEART
V
GREEN GOES LAST
RL
LL
FIRE

6 STEPS TO INTERPRETING EKG'S

#1 P WAVE

Identify & examine the P waves

- Should be present & upright
- Comes before QRS complex
- One P wave for every QRS complex

#2 PR INTERVAL

Measure PR interval

Normal PR interval:
0.12 - 0.2 seconds

#3 QRS WAVE

Is every P wave followed by a QRS complex?

Normal QRS complex:
0.06 - 012

- Should not be widened or shortened
  – this may indicate problems!

Widen is often seen in PVC's, Electrolyte imbalances & drug toxicity!

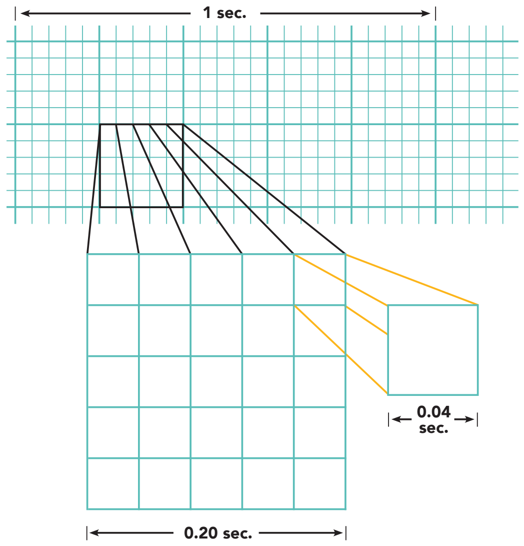
#4 R-R

Are the R to R intervals consistent

- Regular or irregular?

BASIC RHYTHMS

NORMAL SINUS	60 - 100 bpm
SINUS TACHYCARDIA	> 100 bpm
SINUS BRADYCARDIA	< 60 bpm



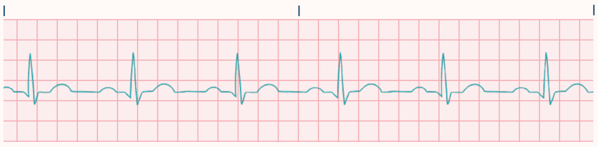
1 large box = 0.20 seconds
5 large boxes = 1 second
1 small box = 0.04 seconds

#5 DETERMINE THE HEART RATE

6 SECOND METHOD

Count the number of R's in between the 6 second strips & multiply by 10

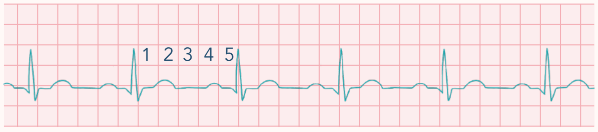
Be sure and check that the strip is 6 seconds! Count the boxes



6 R's X 10 = 60 beats per minutes

BIG BOX METHOD

300 divided by the number of big boxes between 2 R's

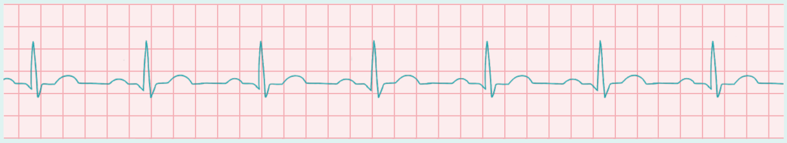


300 / 5 = 60 BPM

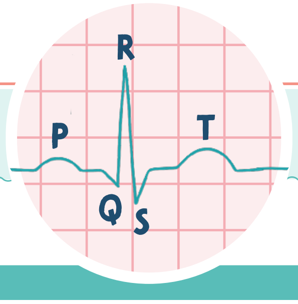
#6 IDENTIFY THE EKG FINDING!

EKG'S

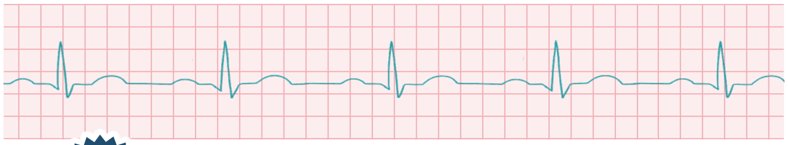
NORMAL SINUS RHYTHM



RATE	60 - 100 bpm
RHYTHM	Regular
P WAVE	Upright & uniform before each QRS
PR INTERVAL	Normal
QRS COMPLEX	Normal



SINUS BRADY



KEY The sinus node creates an impulse at a ***slower***-than-normal rate

RATE	< 60 bpm
RHYTHM	Regular
P WAVE	Upright & uniform before each QRS
PR INTERVAL	Normal
QRS COMPLEX	Normal

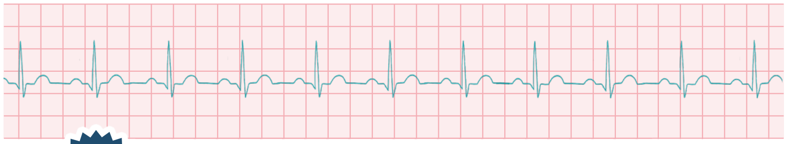
CAUSES

- Lower metabolic needs
  - Sleep, athletic training, hypothyroidism
- Vagal stimulation
- Medications
  - Calcium channel blockers, beta blockers, Amiodarone

TREATMENT

- Correct the underlying cause!
- ↑ the heart rate to normal

SINUS TACHY



KEY The sinus node creates an impulse at a ***faster***-than-normal rate

RATE	> 100 bpm
RHYTHM	Regular
P WAVE	Upright & uniform before each QRS
PR INTERVAL	Normal
QRS COMPLEX	Normal

CAUSES

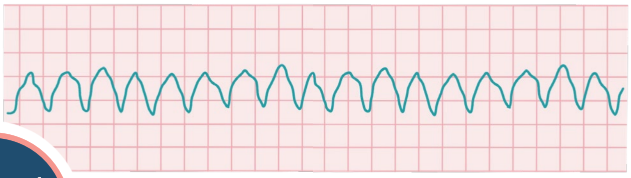
- Physiologic or psychological stress
  - Blood loss, fever, exercise, dehydration
- Certain medications
  - Stimulants - caffeine, nicotine
  - Illict drugs - cocaine, amphetamines
  - Stimulate sympathetic response - epinephrine
- Heart failure
- Cardiac tamponade
- Hyperthyroidism

TREATMENT

- Identify the underlying cause!
- ↓ the heart rate to normal

EKG'S

VENTRICULAR TACHYCARDIA (VT)



Memory trick: looks like tombstones

Irregular, coarse waveforms of different shapes. The ventricles are quivering and there is **no contractions or cardiac output** which may be **fatal**!

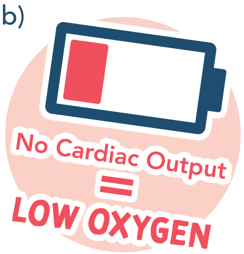
RATE	100 - 250 bpm
RHYTHM	Regular
P WAVE	Not visible
PR INTERVAL	None
QRS COMPLEX	Wide (like tombstones) > 0.12 seconds

CAUSES

- Myocardial ischemia / infarction
- Electrolyte imbalances
- Digoxin toxicity
- Stimulants: caffeine & methamphetamines

MANIFESTATIONS

- Patient is usually awake (unlike V-fib)
- Chest pain
- Lethargy
- Anxiety
- Syncope
- Palpitations



TREATMENT

STABLE CLIENT WITH A PULSE

- Oxygen
- Antidysrhythmics (ex. Amiodarone...stabilizes the rhythm)
- Synchronized Cardioversion

- Synchronized administration of shock (delivery in sync with the QRS wave).
- Cardioversion is NOT defibrillation! (defibrillation is only given with deadly rhythms!)

UNSTABLE CLIENTS WITHOUT A PULSE

Also called **PULSLESS V-TACH**

- CPR
- Follow ACLS protocol for defibrillation
- Possible intubation
- Drug therapy
  - Epinephrine, vasopressin, amiodarone

SHOCK!

UNTREATED VT CAN LEAD TO

↓

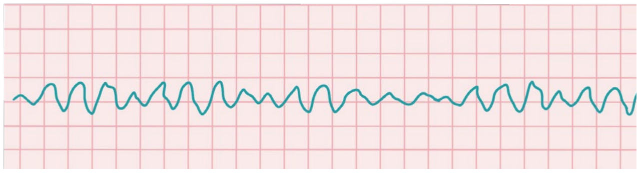
VENTRICULAR FIBRILLATION

↓

DEATH

EKG'S

VENTRICULAR FIBRILLATION (V-FIB)



Rapid, disorganized pattern of electrical activity in the ventricle in which electrical impulses arise from many different foci!

RATE	Unknown
RHYTHM	Chaotic & irregular
P WAVE	Not visible
PR INTERVAL	Not visible
QRS COMPLEX	Not visible

CAUSES

- Cardiac injury
- Medication toxicity
- Electrolyte imbalances
- Untreated ventricular tachycardia

MANIFESTATIONS

- Loss of consciousness
- May not have a pulse or blood pressure
- Respirations have stopped
- Cardiac arrest & death!

NO CARDIAC OUTPUT = NO OXYGEN TO THE BODY

TREATMENT

- CPR
- Oxygen
- Defib (follow ACLS protocol for defibrillation) ⚡
- Possible intubation
- Drug Therapy
  - Vasoconstriction: Epinephrine
  - Antiarrhythmic: Amoidaraon, lidocaine
  - Possibly magnesium

TIP "DEFIB THE VFIB"

CARDIOVERSION VS. DEFIBRILLATION

KEY

CARDIOVERSION

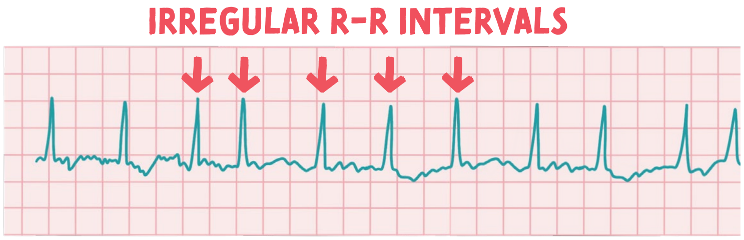
- Synchronized shock
- Lower amount of energy
- Not done with CPR
- Stable clients
  - Ex. A-fib

DEFIBRILLATION

- Asynchronous
- Higher amount of energy
- Resume CPR after shock
- Unstable clients
  - Example: pulseless VT or VF

EKG'S

ATRIAL FIBRILLATION (A-FIB)



Uncoordinated electrical activity in the atria that causes rapid & disorganized "fibbing" of the muscles in the atrium.

RATE	Usually over 100 BPM
RHYTHM	Irregular
P WAVE	None. They are irregular (fibrillary waves)
PR INTERVAL	Visible
QRS COMPLEX	Normal

THE ATRIA IS QUIVERING!

CAUSES

- Open heart surgery
- Heart failure
- COPD
- Hypertension
- Ischemic heart disease

MANIFESTATIONS

- Most commonly asymptomatic
- Fatigue
- Malaise
- Dizziness
- Shortness of breath
- Tachycardia
- Anxiety
- Palpitations

ALL DUE TO LOW 02

TREATMENT

STABLE PT.

- Oxygen
- Drug therapy!
  - Beta blockers
  - Calcium channel blockers
  - Digoxin
  - Amiodarone
  - Anticoagulant therapy to prevent clots

! RISK FOR CLOTS!

The atria quiver causes pooling of blood in the heart which increases the risk for clots = increased risk for MI, PE, CVA's, & DVTs!

UNSTABLE PT.

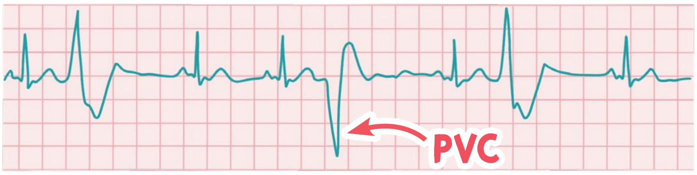
- Oxygen
- Cardioversion
  - Synchronized administration of shock (delivery in sync with the QRS wave).
  - Cardioversion is NOT defibrillation!

! DEFIBRILLATION

Defibrillation is only given with deadly rhythms!

EKG'S

PREMATURE VENTRICULAR CONTRACTIONS (PVCS)



Early "premature" conduction of a QRS complex

RATE	Depends on the underlying rhythm
RHYTHM	Regular but interrupted due to early P waves
P WAVE	Visible but depends on timing of PVC (may be hidden)
PR INTERVAL	Slower than normal but still 0.12 - 0.20 seconds
QRS COMPLEX	Sharp, bizarre, and abnormal during the PVC

CAUSES

- Heart failure
- Myocardial ischemia / infarction
- Drug toxicity
- Caffeine, tobacco, alcohol
- Stress or Pain
- Increased workload on the heart

EXERCISE
FEVER
HYPERVOLEMIA
HEART FAILURE
TACHYCARDIA

BIGEMINY: every **other** beat
TRIGEMINY: every **3rd** beat
QUADRAGEMINY: every **4th** beat

R-ON-T PHENOMENON: PVC arises spontaneously from the repolarization gradient (T-wave) may precipitate V-fib

TREATMENT

TX based on underlying cause

- May not be harmful if the client has a healthy heart
- Oxygen
- Decrease caffeine intake
- Correct the electrolyte imbalances
- D/C or adjust the drug causing toxicity
- Decrease stress or pain

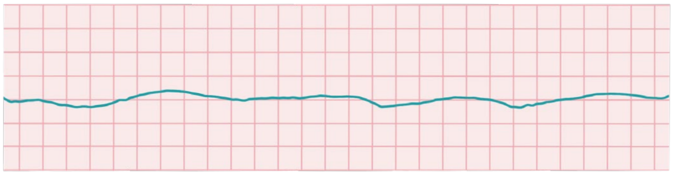
MANIFESTATIONS

- May be asymptomatic
- Feels like your heart...
  - "Skipped a beat"
  - "Heart is pounding"
- Chest pain

CHEST PAIN !

Notify the healthcare provider if the client complains of chest pain, if the PVC's increase in frequency or if the PVC's occur on the T wave (R-on-T phenomenon).

ASYSTOLE



~~RATE~~
~~RHYTHM~~
~~P WAVE~~
~~PR INTERVAL~~
~~QRS COMPLEX~~

FLATLINE

CAUSES

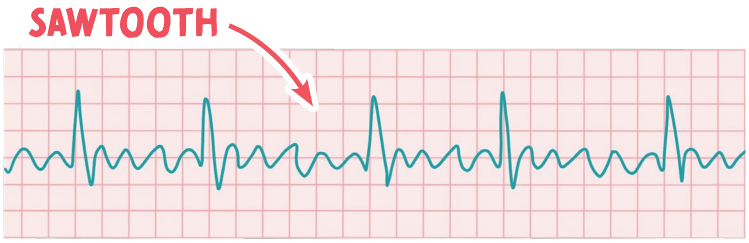
- Myocardial ischemia/infarction
- Heart failure
- Electrolyte imbalances
  (common: hypo/hyperkalemia)
- Severe acidosis
- Cardiac tamponade
- Cocaine overdose

TREATMENT

- **High quality CPR**
  - Heel of hand on the center of the chest
  - Arms straights
  - Shoulders aligned over hands
  - Compress at 2 - 2.4 inches at a rate of 100 - 120 min
  - 30 compressions to 2 rescue breaths
  - Minimal interruptions

EKG'S

ATRIAL FLUTTER



Similar to A-fib, but the heart's electrical signals spread through the atria. The heart's upper chambers (atria) beat too quickly but at a regular rhythm.

RATE	75-150 BPM
RHYTHM	Usually regular
P WAVE	"**Sawtooth**" P wave configuration shaped flutter waves
PR INTERVAL	Unable to measure
QRS COMPLEX	Usually normal & upright

CAUSES

- Coronary artery disease (CAD)
- Hypertension
- Heart failure
- Valvular disease
- Hyperthyroidism
- Chronic lung disease
- Pulmonary embolism
- Cardiomyopathy

MANIFESTATIONS

- May be asymptomatic
- Fatigue / syncope
- Chest pain
- Shortness of breath
- Low blood pressure

TREATMENT

STABLE PT.

- Drug therapy!
  - Calcium channel blockers
  - Antiarrhythmics
  - Anticoagulants

! RISK FOR CLOTS!

Atrial flutter causes pooling of blood in the atria = risk for clots

UNSTABLE PT.

- Cardioversion
  - Synchronized administration of shock (delivery in sync with the QRS wave).
  - Cardioversion is NOT defibrillation!

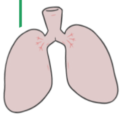
! DEFIBRILLATION

Defibrillation is only given with deadly rhythms!

HEART FAILURE

SIGNS & SYMPTOMS

LEFT SIDED HF



LEFT SIDE THINK LUNGS

Fluid is backing up into the lungs = pulmonary symptoms

D yspnea

R ales (crackles)

O rthopnea

W eakness / fatigue

N octurnal paroxysmal dyspnea

I ncreased HR

N agging cough *(frothy, blood tinged sputum)*

G aining weight (2 -3 lb's a day)

OTHER S&S
↑ UOP
Hypotension
S3 Gallop

RIGHT SIDED HF

Fluid is backing up into the venous system

Swelling of the legs & hands

Weight gain

Edema (pitting)

Large neck veins (JVD)

Lethargy / fatigue

Irregular heart rate

Nocturia

Girth (Ascites)

OTHER S&S
Hepatomegaly
Splenomegaly
Anorexia

SYSTOLIC HF VS. DIASTOLIC HF

SYSTOLIC HF

Weakened heart muscle

The ventricle does not **EJECT** properly

EF REDUCED

DIASTOLIC HF

Stiff & non-compliant heart muscle

The ventricle does not **FILL** properly

NORMAL EF

EJECTION FRACTION (EF)

Amount of blood **PUMPED OUT**

Amount of blood **IN THE CHAMBER**

% EF

NORMAL EJECTION FRACTION 50% - 70%

HEART FAILURE: DIAGNOSIS & INTERVENTIONS

DIAGNOSIS

BNP

B-TYPE NATRIURETIC PEPTIDE

Secreted when there is ↑ pressure in the ventricle

BNP ↑ in HF

CHEST X-RAY

Enlarged heart
&
pulmonary infiltrates

ECHOCARDIOGRAM

Looks at ejection fraction, back flow, & valve problems

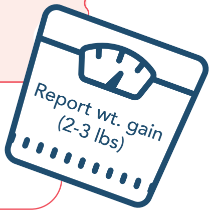
EF is ↓ in most types of HF

INTERVENTIONS

MONITOR

Strict I&O's
Daily weights
Edema

Same time
Same scale
Same clothes



DIET MODIFICATIONS

Fluid restrictions
↓ Sodium
↓ Fat
↓ Cholesterol

Spread fluids out during the day
Suck on hard candy to ↓ thirst

REPORT S&S OF FLUID RETENTION

Edema
Weight gain

ELEVATE HOB

(Semi-Fowler's position)

BALANCE PERIODS OF ACTIVITY & REST

CORONARY ARTERY DISORDERS (CAD)

RISK FACTORS

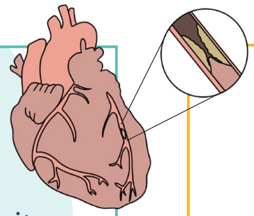
NON-MODIFIABLE

- Age
- Gender
- Race
- Family history

MODIFIABLE

Diabetes	Obesity
Hypertension	Physical inactivity
Smoking	High cholesterol

Metabolic Syndrome



PATHO

Fatty plaques develop
↓
Called **ATHEROSCLEROSIS**
↓
Restriction of blood flow to the heart

SIGNS & SYMPTOMS

ISCHEMIA → **ANGINA PECTORIS**

Inadequate blood supply to the heart = ↓ O_2 to the heart.

Chest pain that is caused by **myocardial ischemia**

- Chest pain w/ activity
- Shortness of breath
- Fatigued

ISCHEMIA: ↓ O_2
INFARCTION: Death

PREVENTION

- Management of hypertension
- Management of diabetes
- Smoking cessation
- Diet
- Exercise

DIAGNOSIS

BLOOD TEST – Lipoprotein profile

- LDL
- HDL
- Total Cholesterol
- Triglycerides

ECG

- Assess for changes in ST segments or T waves!

TREATMENT

- Lipid-lowering medications "Statins"
- Heart-healthy diet
- Physical activity
- Smoking cessation
- Stress management
- Hypertension management
- Diabetes management
- Coronary stent / angioplasty
- Coronary Artery Bypass Graft (CABG)

WEEKLY EXERCISE GOALS
Moderate: 75 min
Vigorous: 150 min

Cholesterol

LDL → Want **L**OW Levels (<100 mg/dL)
BAD CHOLESTEROL
Low Density Lipoprotein

HDL → Want **H**IGH Levels (>60 mg/dL)
HAPPY CHOLESTEROL
High Density Lipoprotein

PERIPHERAL VASCULAR DISEASE

is an umbrella term for...

PERIPHERAL VENOUS DISEASE (PVD)

Deoxygenated blood can't get back to the heart.

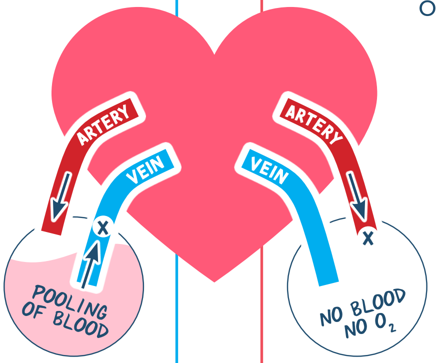
Pooling of oxygenated blood in the extremities.

PERIPHERAL ARTERIAL DISEASE (PAD)

Think "BAD"

Narrow artery (atherosclerosis) where oxygenated blood can't get to the distal extremities (hands & feet).

Ischemia & necrosis of the extremities



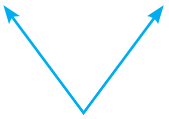
	PVD		PAD	
PAIN ?	✓	Dull, constant, achy pain!	✓	Sharp pain: Gets worse at night "rest pain" Intermittent claudication
PULSE ?	✓	May not be palpable due to edema	✓	Very poor or even absent
EDEMA ?	✓	Blood is POOLING in the leg	✗	No blood in the extremities
TEMP ?		Warm legs (Blood is warm)		Cool No blood = cool leg (blood is warm)
COLOR ?		Stasis dermatitis (Brown/yellow)		Pale, hairless, dry, scaly, thin skin due to lack of nutrients (↓ O_2)
WOUNDS ?		Venous STASIS ulcers, Irregular shaped wounds, shallow		Regular in shape, red sores round appearance "punched out"
GANGRENE ?	✗	We have too much blood! Gangrene is caused by insufficient amounts of blood.	✓	Tissue death caused by a lack of blood supply
POSITIONING ?		Elevate Veins Positions that make it worse: dangling, sitting/standing for long periods of time		Dangle arteries

CAUSES OF BOTH

Smoking • Diabetes • High cholesterol • Hypertension

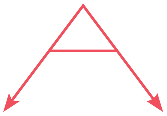
DX: Doppler Ultrasound or Ankle Brachial Index (ABI)

TREAMENT — KEEP VEIN OPEN!



- **Elevate Veins**
- **Medications**
  - Aspirin or Clopidogrel
  - Cholesterol lowering drugs "statin"
- **Surgery**
  - Angioplasty
  - Bypass (CABG)
  - Endarterectomy

TREAMENT — GET BLOOD MOVING!



- **DAngle Arteries** (Dependent position)
- **Perform daily skin care with moisturizer**
- **Stop smoking**
- **Avoid tight clothing** (vasoconstriction)
- **No heating pads!**
- **Medications**
  - Vasodilators
  - Antiplatelets

ANGINA PECTORIS

Chest pain that is caused by myocardial ischemia

TYPES OF ANGINA

STABLE

"Predictable"

Occurs with

EXERTION

↑ myocardial demand for oxygen

UNSTABLE

"Preinfarction"

Occurs at

REST

& more frequently

PRINZMETAL'S / VARIANT

"Coronary artery vasospasm"

Pain at rest with reversible

ST-ELEVATION

MANIFESTATIONS

- Chest pain (heavy sensation) may radiate to neck, jaw, or shoulders
- Unusual fatigue
- Weakness
- Shortness of breath
- Pallor
- Diaphoresis

INTERVENTIONS

GOAL: ↓ OXYGEN DEMAND

REPERFUSION PROCEDURES

PCI

Percutaneous Coronary Interventions

CABG

Coronary Artery Bypass Graft

DRUG THERAPY

NITRATES

- Vasodilators
- ↓ischemia = ↓pain
- Usually administered sublingually

CALCIUM CHANNEL BLOCKERS

- Relaxes blood vessels
- ↑oxygen supply to the heart
- ↓workload of heart

BETA BLOCKERS

- ↓myocardial oxygen consumption

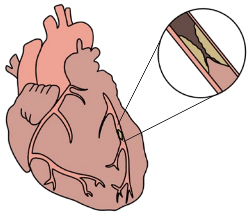
ANTIPLATELET / ANTICOAGULANT

- Prevents platelet aggregation & thrombosis

MYOCARDIAL INFARCTION (MI)

PATHO

Complete blockage in one or more arteries of the heart



ARTHEROSCLEROSIS

Coronary arteries become narrow due to plaque build-up

→

ANGINA

Due to ischemia (low O2)

→

MYOCARDIAL INFARCTION (MI)

Plaque rupture become a blood clot that blocks arteries of the heart

SIGNS & SYMPTOMS

SUDDEN, CRUSHING, RADIATING CHEST PAIN THAT CONTINUES DESPITE REST & MEDICATIONS

- Shortness of breath
- Nausea & vomiting
- Sweating
- Pale & dusty skin

PAIN FELT IN THE...

- Left arm
- Mid back/shoulder
- Heartburn

WOMEN PRESENT WITH DIFFERENT SYMPTOMS

- Fatigue
- Shoulder blade discomfort
- Shortness of breath

DIAGNOSIS

- **ECG**
  - ST-Elevation (no O2)
  - ST-Depression (low O2) T-wave inversion
- **TROPONIN**
- **STRESS TEST**
  - Chemical & excercise

TREATMENT

IMMEDIATE

→

M **MORPHINE**
↓workload of the heart & ↓ pain

O **OXYGEN**
↑O2 to the heart

N **NITROGLYCERIN**
opens up the vessels

A **ASPRIN**
Prevents platelets from sticking together

CATH LAB OR CLOT BUSTER

→

MEDICATIONS

- Thrombolytics (clot busters)
- *Example: Streptokinase*

Suffixes:
-teplase
-ase

SURGERY

- PCI "Percutaneous Coronary Intervention"
- CABG
- Endarterectomy
  - Cut out the blockage

PREVENTION & REST

PREVENT / STABILIZE CLOT

- Heparin IV

REST THE HEART WITH...

- Nitro
- Beta-Blockers
- Calcium channel blockers

ANY TIME YOU GIVE A THROMBOLYTIC, WATCH FOR SIGNS OF BLEEDING!

CARDIAC BIOMARKERS

TROPONIN

Protein released in the blood stream when the heart muscle is damaged.

There are 3 isomers of troponin

- ➥ **Troponin C:** binds calcium to activate muscle contraction
- ➥ **Troponin I & T:** specific for cardiac muscle

BEST indicator of an acute MI

TROPONIN I

RANGE 0 - 0.4 NG/ML

> 0.4 = Heart attack!

PEAK CAN REMAIN ELEVATED FOR AS LONG AS 3 WEEKS

CK-MB

CREATINE KINASE - MB

An enzyme released in the bloodstream when the heart, muscles or brains are damaged!

Cardiac-specific isoenzyme
BUT less reliable than Troponin

RANGE 0 - 5 NG/ML

PEAK 24 HOURS

MYOGLOBIN

Myoglobin is found in cardiac & skeletal muscle

NOT a specific indicator of an acute MI,
but a (-) sign is good for ruling out an acute MI

Myoglobin Think Muscle

RANGE 5 - 70 NG/ML

PEAK 12 HOURS

BNP

BRAIN NATRIURETIC PEPTIDE

A peptide released when the ventricle is filled with too much fluid and STRETCHES!

Indicates heart failure (HF)

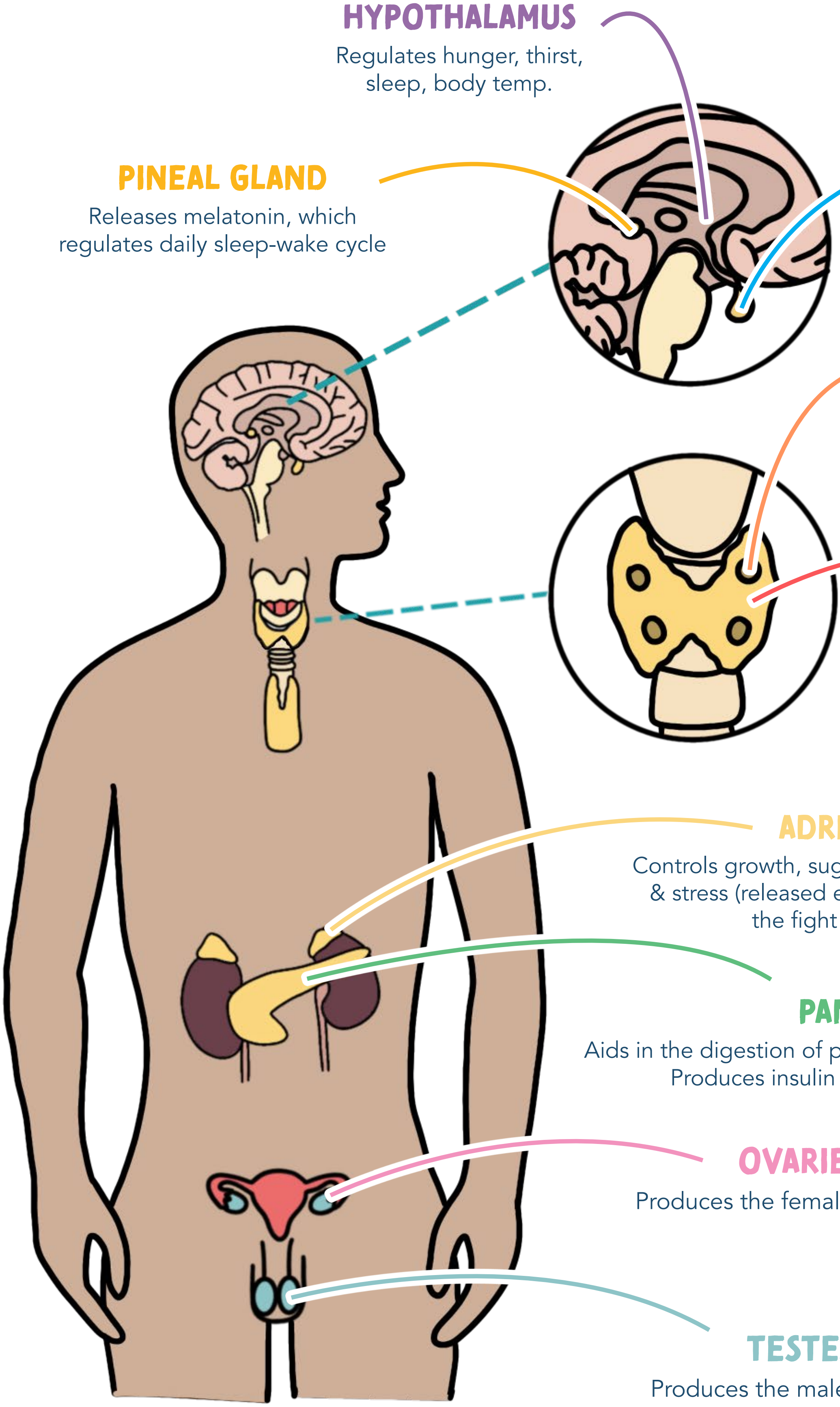
RANGE

Normal: **<100 PG/ML**
Mild HF: **100 - 300**
Moderate HF: **300 - 700**
Severe HF: **>700**

MED-SURG

ENDOCRINE SYSTEM

ENDOCRINE SYSTEM OVERVIEW



HYPOTHALAMUS

Regulates hunger, thirst, sleep, body temp.

PINEAL GLAND

Releases melatonin, which regulates daily sleep-wake cycle

PITUITARY GLAND

Regulates energy, metabolism, and growth

PARATHYROID GLAND

Helps regulate calcium & phosphorus in the blood

THYROID GLAND

Regulates energy, metabolism, and growth.

Produces 3 hormones →

HORMONES

- THYROXINE (T4)
- TRIIODOTHYRONINE (T3)
- CALCITONIN

ADRENAL GLAND

Controls growth, sugar metabolism, kidney function, & stress (released epinephrine & norepinephrine, the fight or flight hormones)

PANCREAS

Aids in the digestion of protein, fats, and carbohydrates. Produces insulin to control blood sugar.

OVARIES

Produces the female hormones →

HORMONES

- ESTROGEN
- PROGESTERONE

TESTES

Produces the male hormone →

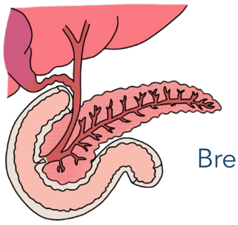
HORMONES

- TESTOSTERONE

DIABETES TYPE 1 & 2

HOW THE PANCREAS WORKS (WITH FOOD)

Consume food
↓
Blood sugar increases
↓
This causes the pancreas to release insulin
↓
Insulin puts sugar & potassium into the cells!



HOW THE PANCREAS WORKS (WITH NO FOOD)

NO food
↓
Pancreas "back up plan"
↓
Glucagon hormone is released
↓
Breaks down stored glucose (glucagon) in the liver
↓
Releases glucose into the blood stream

TYPE 1 DIABETES

NO INSULIN PRODUCTION "type **ONE** we have n**ONE**"

PATHOLOGY

- Usually diagnosed in childhood
- Caused by an autoimmune response
- The cells are starved of glucose since there is no insulin to bring it into the cells
- The cells break down protein and fat into energy causing ketones to build up = **ACIDOSIS**!

TYPE 2 DIABETES

DOES NOT PRODUCE ENOUGH INSULIN
OR PRODUCES "BAD" INSULIN THAT DOES NOT WORK PROPERLY

PATHOLOGY

- Insulin resistance
- Insulin receptors are worn out & not working properly!
- Onset usually as an adult and is due to a poor diet, sedentary life style & obesity!

SIGNS & SYMPTOMS

ONSET: ABRUPT

TREATMENT

Insulin only!
Oral hypoglycemic agents will not work for this pt.
Insulin dependent for life!

Hyperglycemia
Glucose >115 & HbA1C 6.5 +

3 P'S
Polyuria: Excessive peeing
Polydipsia: Excessive thirst
Polyphagia: Excessive hunger

ONSET: GRADUAL

TREATMENT

Diet & exercise

Oral hypoglycemic agents
Example: Metformin

Possibly Insulin

COMPLICATIONS

DIABETIC KETOACIDOSIS (DKA)

ONSET: ABRUPT

PATHOLOGY

Not enough insulin
↓
Blood sugar becomes VERY high
↓
Cells break down protein & fat into energy
↓
Ketones build up = Acidosis!

SIGNS & SYMPTOMS

- Ketosis & acidosis
- Hyperglycemia
- Dehydration
- Kussmaul respirations (trying to blow off CO2)
- Acid breath "fruity breath"

TREATMENT

IV INSULIN • Fluid replacement
Correction of electrolyte imbalances

COMPLICATIONS

HYPEROSMOLAR HYPERGLYCEMIC STATE (HHS)

ONSET: GRADUAL

PATHOLOGY

NO acidosis present!

Simply high amounts of glucose in the blood

SIGNS & SYMPTOMS

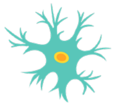
Hyperglycemia
>600 +

TREATMENT

Fluid replacement
Correction of electrolyte imbalances
Possible Insulin administration

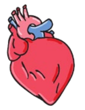
LONG TERM COMPLICATIONS

KIDNEY
NEPHROPATHY
Renal Failure



NERVES
RENAL NEUROPATHY
Loss of sensation

EYE
RETINOPATHY



HEART
HTN & ATHEROSCLEROSIS

HYPERGLYCEMIA VS. HYPOGLYCEMIA

BLOOD GLUCOSE GOAL: 70 - 110 mg/dL

HYPERGLYCEMIA

↑ BLOOD SUGAR

>200 mg/dL
Gradual (hours to days)

SIGNS & SYMPTOMS

- Polyuria
- Polydipsia
- Polyphagia
- Hot & dry skin
- Dry mouth (dehydration)
- Fruity breath
- Deep, rapid breaths (air hunger)
- Numbness & tingling
- Slow wound healing
- Vision changes

CAUSES

4 S's

- **S**epsis (infection)
- **S**tress
- **S**teroids
- **S**kipping insulin or oral diabetic medication
- Not eating a diabetic diet

TREATMENT

- Administer insulin as needed
- Test urine for ketones

DIABETIC DIET

✓	✗
Complex carbohydrates	Saturated fats
Fiber-rich foods	Trans fats
Heart-healthy fish	Cholesterol
"Good fats"	Sodium
Sugar-free fluids	

HYPOGLYCEMIA

↓ BLOOD SUGAR

THE BRAIN NEEDS GLUCOSE... NO GLUCOSE CAUSES **BRAIN DEATH!**

<70 mg/dL
Happens suddenly

SIGNS & SYMPTOMS

- Cool & clammy skin
- Sweating (Diaphoresis)
- Palpitations
- Fatigue & weakness
- Confusion
- Headache
- Shakiness
- Inability to arouse from sleep
  ➥ Can lead to coma ⚠

CAUSES

- Exercise
  - Swimming, cycling, college athlete etc.
- Alcohol
- Peak times of Insulin

TREATMENT

CONSCIOUS PATIENTS

15 X 15 X 15

- Oral intake of **15 GRAMS** of carbohydrates
  Juices, soda, low fat milk. NOT peanut butter or high fat milk
- Recheck blood glucose in **15 MIN**
- Give another **15 GRAMS** of carbohydrates if needed

UNCONSCIOUS PATIENTS

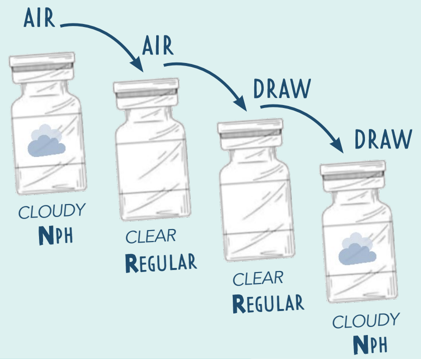
Do not put anything in an unconscious client's mouth, they can **ASPIRATE**!

ADMINISTER IV 50% DEXTROSE (D50)

INSULIN TYPES

	GENERIC	BRAND NAME		
RAPID	**LISPRO** **ASPART** **GLULISINE**	Humalog Novolog Apidra	ONSET: 5 - 30 min PEAK: 30 - 90 min DURATION: 3 - 5 hrs	**HIGHEST RISK FOR HYPOGLYCEMIA**
SHORT CLEAR	**REGULAR**	Humulin **R** Novolin **R**	ONSET: 30 - 60 min PEAK: 2 - 4 hrs DURATION: 5 - 7 hrs	**ONLY INSULIN GIVEN IV** "**R**egular goes **R**ight into the vein"
INTERMEDIATE CLOUDY	**NPH**	Humulin **N** Novolin **N**	ONSET: 1 - 2 hrs PEAK: 4 - 12 hrs DURATION: 18 - 24 hrs	**NEVER GIVE IV**
LONG	**GLARGINE** **DETEMIR**	Lantus Levemir	ONSET: 1 - 2 hrs PEAK: None DURATION: 24 hrs+	**LOWEST RISK FOR HYPOGLYCEMIA** **Do not mix** with any other insulin

MIXING REGULAR INSULIN & NPH INSULIN



How to remember this order?

"You are **N**ot **R**etired you are an **RN**"

ADMINISTRATION

- Must be given subcut or IV
  - Insulin is destroyed by the GI tract so it can not be given PO
- Remove all air bubbles
- Rotate site 1 inch from previous site
- Common sites: back of arms, thighs & abdomen (at least 2 inches away from the belly button)

COMPLICATIONS

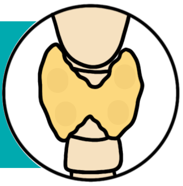
- Hypoglycemia (especially with rapid insulin)
- Weight gain
  - ➥ Insulin is a growth hormone
- Lipoatrophy (loss of subcut fat)

THYROID DISORDERS

FUNCTION

☞ The thyroid gland produces 3 hormone (T3, T4, & Calcitonin)
- You need **IODINE** to make these hormones

☞ Thyroid gives you **ENERGY**!



↑ HYPERTHYROIDISM

PATHOLOGY

Excessive production of thyroid hormone

TOO MUCH ENERGY!

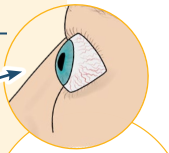
- Graves disease
- Too much Iodine (helps makes T3 + T4)
- Toxic Nodular Goiter
- Thyroid replacement medication (Toxicity)

LAB VALUES

↑ T3 & T4 ↓ TSH

SIGNS & SYMPTOMS

- Hyper-excitable
- Nervous/tremors
- Irritable
- ↓ Attention span
- Increased appetite
- Weight loss
- Hair loss
- Goiter (enlarged thyroid)
- Hot
- **EXOPHTHALMOS**
- Increased:
  - Blood pressure
  - Pulse
  - GI function



Bulging eyes due to fluid accumulation behind the eyes

⚠ LIFE-THREATENING COMPLICATIONS

THYROID STORM!

ACUTE / LIFE THREATENING EMERGENCY!

TREATMENT

- Anti-Thyroid Medications
  - Methimazole or PTU
- Beta Blockers (↓ HR & BP)
- Iodine Compounds
- Radioactive Iodine Therapy
- Thyroidectomy

↓ HYPOTHYROIDISM

PATHOLOGY

Low production of thyroid hormone

NOT ENOUGH ENERGY!

Most Common

- Hashimoto's disease
- Not enough Iodine
- Thyroidectomy
- Anti-thyroid medications
- Pituitary hormone
- Affects women more often then men

LAB VALUES

↓ T3 & T4 ↑ TSH

SIGNS & SYMPTOMS

- No energy
- Fatigue
- No expressions
- Weight gain
- Cold
- Amenorrhea
- Slurred speech
- Dry skin
- Coarse hair
- Decreased
  - HR
  - GI function (constipation)
  - Blood sugar (Hypoglycemia)

⚠ LIFE-THREATENING COMPLICATIONS

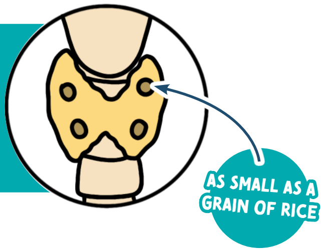
MYXEDEMA COMA!

TREATMENT

- Hormone replacement (replacing levothyroxine)
  - Synthetic levothyroxine
    - Synthroid or Levothroid
  - *Will be on this medication forever*

PARATHYROID GLAND DISORDERS

The parathyroid gland produces and secretes PTH (parathyroid hormone) which controls the levels of **CALCIUM** in the blood



↑ PTH

HYPERPARATHYROIDISM

↑ CALCIUM ↓ PHOSPHORUS

CAUSES

PRIMARY CAUSE:
Tumor or hyperplasia of the parathyroid

SECONDARY CAUSE:
Chronic kidney failure

SIGNS & SYMPTOMS

- **STONES:** Kidney stones (↑ calcium)
- **BONES:**
  - Skeletal pain
  - Pathological fractures from bone deformities
- Abdominal **MOANS**
  - Nausea, vomiting, and abdominal pain
  - Weight loss / anorexia
  - Constipation
- Psychic **GROANS**
  - Mental irritability
  - Confusion

STONES, BONES, MOANS, & GROANS

TREATMENT

- Parathyroidectomy
- Removal of more than one gland
- Administer
  - Phosphates, calcitonin, & IV or oral bisphosphonates
- DIET: ↑ fiber & moderate calcium

↓ PTH

HYPOPARATHYROIDISM

↓ CALCIUM ↑ PHOSPHORUS

CAUSES

- Can occur due to accidental removal of the parathyroid
  - Thyroidectomy, parathyroidectomy, or radical neck dissection
- Genetic predisposition
- Exposure to radiation
- Magnesium depletion

SIGNS & SYMPTOMS

- Numbness & tingling
- Muscle cramps
- Tetany
- Hypotension
- Anxiety, irritability, & depression

Same S&S of hypocalcemia!

POSITIVE TROUSSEAU'S:
Carpal spasm caused by inflating a blood pressure cuff

CHVOSTEK'S SIGNS:
Contraction of facial muscles with light tap over the facial nerve

TREATMENT

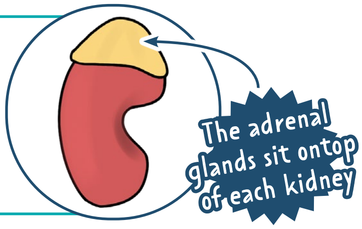
- IV Calcium
- Phosphorus binding drugs
- DIET: ↑ Calcium ↓ Phosphorus

ADRENAL CORTEX DISORDERS

ADRENAL CORTEX HORMONES:

RETAINS:
NA+ & H_2O
LOSES:
K+

GLUCOCORTICOIDS
MINERALOCORTICOIDS
SEX HORMONES



↑ CUSHING'S

Disorder of the adrenal cortex

Too many steroids

THEY "HAVE A CUSHION"

CAUSES

- Females
- Overuse of cortisol medications
- Tumor in the adrenal gland that secretes cortisol

SIGNS & SYMPTOMS

- Muscle wasting
- Moon face
- Buffalo hump
- Truncal obesity w/ thin extremities
- Supraclavicular fat pads
- Weight gain
- Hirsutism (masculine characteristics)
- ↑ Glucose ↑ NA+
- ↓ K+ ↓ CA+
- Hypertension

TREATMENT

- Adrenalectomy
  - Requires lifelong glucocorticoid replacement
- Avoid infection
- Adm. chemotherapeutic agents if adrenal tumor is present

↓ ADDISON'S

Disorder of the adrenal cortex

Not enough steroids

WE NEED TO "ADD" SOME

CAUSES

- Surgical removal of both adrenal glands
- Infection of the adrenal glands
- TB, cytomegalovirus, & bacterial infections

SIGNS & SYMPTOMS

- Fatigue
- Nausea / vomiting / diarrhea
- Anorexia
- Hypotension & Hypovolemia!
- Confusion
- ↓ Blood sugar
- ↓ Na & H_2O ↑ K+
- Hyperpigmentation of the skin
- **Vitiligo**: white areas of depigmentation

ADDISONIAN CRISIS

SIGNS & SYMPTOMS

- Profound fatigue
- Dehydration.....shock!
- Renal failure
- Vascular collapse
- Hyponatremia
- Hyperkalemia

TREATMENT

Fluid resuscitation & high-dose hydrocortisone

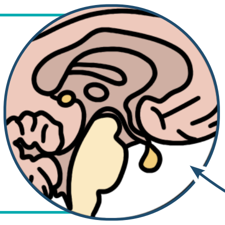
TREATMENT

- Adm. glucocorticoid and/or mineralocorticoid
- Diet: high in protein & carbs

PITUITARY GLAND DISORDERS

ANTIDIURETIC HORMONE (ADH):

ADH REGULATES & BALANCES
THE AMOUNT OF WATER IN YOUR BLOOD


ADH is found in the PITUITARY GLAND!

SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE (SIADH)

➥ SIADH is often of non-endocrine origin

Too much ADH

RETAINS WATER

CAUSES

- Pulmonary disease
  - ➥ TB
  - ➥ Severe pneumonia
- Disorders of the CNS
  - ➥ Head injury
  - ➥ Brain surgery
  - ➥ Tumor
- HIV
- Medications
  - Vincristine
  - Phenothiazines
  - Antidepressants
  - Thiazide diuretics
  - Anticonvulsants
  - Antidiabetic drugs
  - Nicotine

SIGNS & SYMPTOMS

- Low urinary output of concentrated urine
- Fluid volume overload
- Weight gain without edema
- Hypertension
- Tachycardia
- Nausea & vomiting
- Hyponatremia

TREATMENT

- Implement seizure precautions
- Elevate HOB to promote venous return
- Restrict fluid intake
- Adm. loop diuretics
- Adm. vasopressin antagonists

INCREASED ICP
Can lead to an ADH problem

DIABETES INSIPIDUS (DI)

➥ **DI** think **D**ry **I**nside!

Not enough ADH

LOSES WATER

CAUSES

- Head trauma, brain tumor
- Manipulation of the pituitary
  - ➥ Surgical ablation, craniotomy, sinus surgery, hypophysectomy
- Infections of the central nervous system (CNS)
  - ➥ Meningitis, encephalitis, or TB
- Failure of the renal tubules to respond to ADH

SIGNS & SYMPTOMS

- Excretes large amounts of diluted urine
- Polydipsia (increased thirst)
- Polyuria (increased urine output)
- Dehydration
- Decreased skin turgor
- Dry mucous membranes
- Muscle pain & weakness
- Headache
- **Postural hypotension**
- **Tachycardia**
- **Low urinary specific gravity**

Normal specific gravity
1.005 - 1.030

TREATMENT

- Adequate fluids
- IV hypotonic saline
- ADH replacement (replace the missing hormone!)
  - ➥ Vasopressin or desmopressin
- Monitor
  - ➥ Intake & output
  - ➥ Weight

ADRENAL MEDULLA DISORDER

ADRENAL MEDULLA HORMONES:

EPINEPHRINE ▪ NORPINEPHRINE

"FIGHT OR FLIGHT" RESPONSE

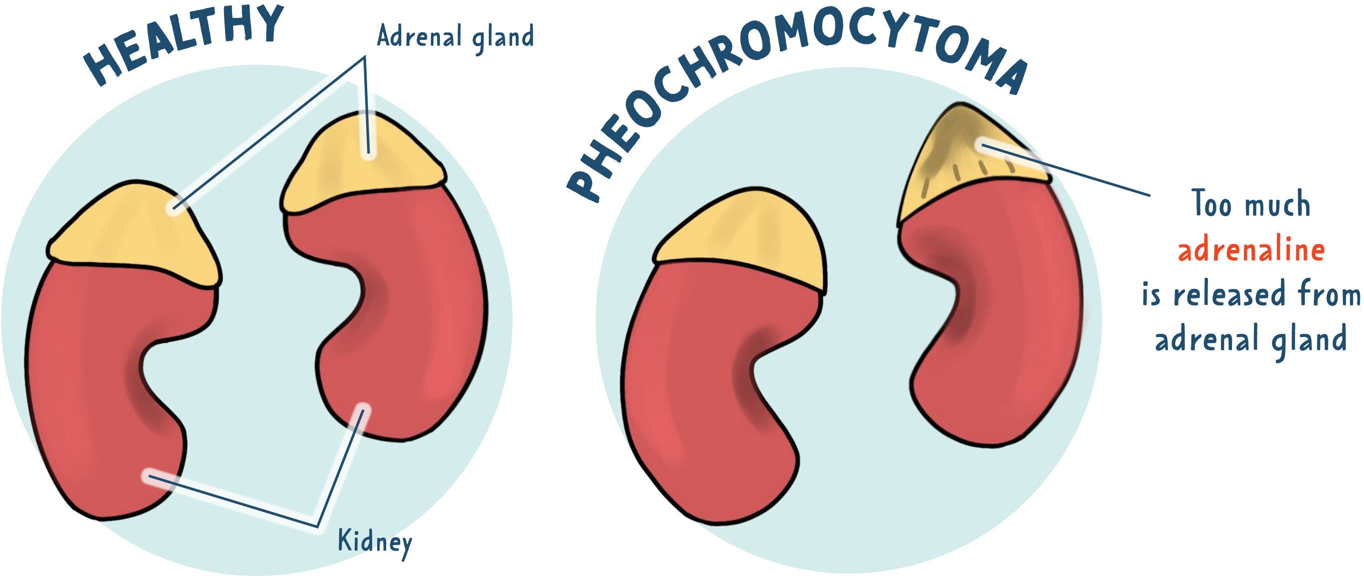
↑

PHEOCHROMOCYTOMA

RARE tumor on the adrenal glad that secretes excessive amounts of epinephrine & norepinephrine

CAUSES

- Family history that makes them prone to developing the tumor



HEALTHY
Adrenal gland
Kidney
PHEOCHROMOCYTOMA
Too much adrenaline is released from adrenal gland

SIGNS & SYMPTOMS

H's

- **H**ypertension (severe)
- **H**eadache
- **H**eat (excessive sweating)
- **H**ypermetabolism
- **H**yperglycemia

Avoid Stimuli!

It may cause a hypertensive crisis!

TREATMENT

- Adrenalectomy (if a tumor is present)
- Tell the client not to smoke, drink caffeine or change position suddenly
- Adm. anti-hypertensives
- Promote rest & calm environment
- Diet: high in calories, vitamins, & minerals

MED-SURG

RESPIRATORY DISORDERS

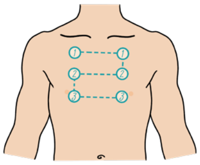
AUSCULTATING LUNG SOUNDS

TIPS FOR LISTENING

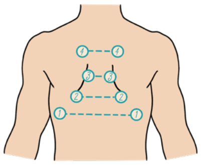
- Listen directly on the skin with the diaphragm
- Listening inside the **IN**tercostal spaces (**IN** *between the ribs*)
- Listen to the anterior & posterior chest
- Have the client sit upright (high fowler's), arms resting across the lap.
- Instruct client to take deep breaths
- Listen from top to bottom (comparing sides)

Listen for a
FULL INHALATION TO EXPIRATION
on each spot

ANTERIOR
Will hear
UPPER lobes well

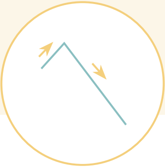


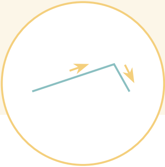
POSTERIOR
Will hear
LOWER lobes well

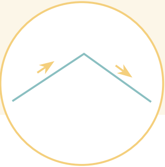


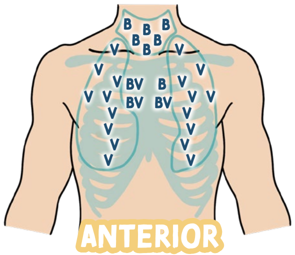
NORMAL SOUNDS

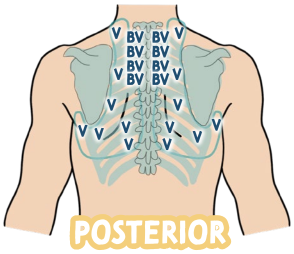
	BRONCHIAL (TRACHEAL)	VESICULAR	BRONCHOVESICULAR
DESCRIPTION	High, loud & hollow tubular	Soft, low pitched, breezy / rushing sound	Medium pitched, hollow
LOCATION HEARD	Anteriorly only (heard over trachea & larynx)	Heard anterior & posteriorly	Heard anterior & posteriorly
DURATION	Inspiration < expiration	Inspiration > expiration	Inspiration = expiration











ABNORMAL (ADVENTITIOUS) SOUNDS

DISCONTINUOUS SOUNDS

DISCRETE CRACKLING SOUNDS

FINE CRACKLES (RALES)

DESCRIPTION: High pitched, crackling sounds (Sound like fire crackling, or velcro coming part)

DUE TO: Previously deflated airways that are popping back open

EXAMPLE: Pulmonary edema, asthma, obstructive diseases

COARSE CRACKLES (RALES)

DESCRIPTION: Low pitched, wet bubbling sound

DUE TO: Inhaled air collides with secretion in the trachea or large bronchi

EXAMPLE: Pulmonary edema, pneumonia, depressed cough reflex

PLEURAL FRICTION RUB

DESCRIPTION: Low pitched, harsh / grating sounds

DUE TO: Pleura is inflamed and loses it's lubricant fluid. It's literally the surfaces rubbing together during respirations

EXAMPLE: Pleuritis

CONTINUOUS SOUNDS

CONNECTED MUSICAL SOUNDS

WHEEZES

DESCRIPTION: High-pitched musical instrument with more than one type of sound quality (polyphonic)

DUE TO: Air moving through a narrow airway

EXAMPLE: Asthma, bronchitis, chronic emphysema

STRIDOR

DESCRIPTION: High pitched whistling or gasping with harsh sound quality

DUE TO: Disturbed airflow in larynx or trachea

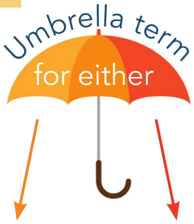
EXAMPLE: Croup, epiglottis, any airway obstruction

🚨 REQUIRES MEDICAL ATTENTION

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

PATHOLOGY

Pulmonary disease
that causes
chronic airflow
obstruction



EMPHYSEMA or **CHRONIC BRONCHITIS**

OTHER FACTS

- COPD is a progressive disorder which means the disease gets worse over time; it's irreversible!
- Alveoli sac lose their elasticity (inability to fully exhale)

DIAGNOSTIC

- Arterial blood gases (ABG's)
- Chest x-ray
- Pulmonary function test: Spirometry

Obstructive lung disease
FEV1 / **FVC** ratio of less than 70%

FEV1
=
FORCED EXPIRATORY VOLUME

FVC
=
FORCED VITAL CAPACITY

RISK FACTORS

- Smoking ⚠ **MOST COMMON**
  - ➥ Breathing in harmful irritants
- Occupation exposure
- Infection
- Air pollution
- Genetic abnormalities → Deficiency of Alpha1- antitrypsin (*Protects the lining of the lungs*)
- Asthma
- Severe respiratory infection in childhood

EMPHYSEMA VS CHRONIC BRONCHITIS

EMPHYSEMA

Abnormal distention of airspaces

Enlargement & destruction of airspace distal to the terminal bronchiole

Hyperventilation (breathing fast)
Trying to blow off CO_2

LIMITED AIRFLOW
↓ O_2
&
↑ CO_2

CHRONIC BRONCHITIS

Mucus secretion

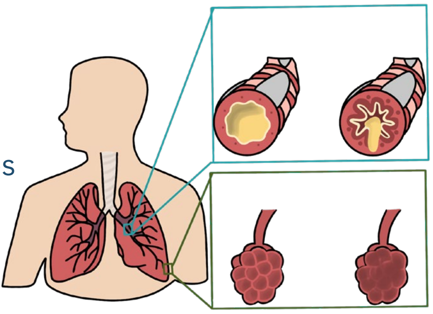
Airway obstruction (inflammation)

Chronic productive cough
& sputum production
for >3 months (within 2 consecutive years)

SIGNS & SYMPTOMS

"PINK PUFFERS"

- Hyperinflation of the lungs (barrel chest)
- Thin - weight loss
  - ➥ Burning a lot of calories from breathing a lot!
- Shortness of breath
- Severe dyspnea



SIGNS & SYMPTOMS

"BLUE BLOATERS"

- Overweight
- Cyanotic (blue) - Hypoxemia
  - ➥ ↓ O_2 & ↑ CO_2
- Peripheral edema
- Rhonchi & wheezing
- Chronic cough

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

NURSING MANAGEMENT & EDUCATION

MONITOR RESPIRATORY SYSTEM

- Lung sounds
- Sputum production
- Oxygen status

LIFESTYLE MODIFICATIONS

- Smoking cessation
  - ➥ Determine readiness
  - ➥ Develop a plan
  - ➥ Discuss nicotine replacement

DIET MODIFICATIONS

- Promote nutrition
- Increase calories
- Small frequent meals
- Stay hydrated
  - ➥ Thins mucous secretions

TEACH PROPER BREATHING TECHNIQUES

- Pursed lips
- Diaphragmatic breathing

SURGERY

- Bullectomy
- LVRS: lung volume reduction surgery
- Lung transplant

STAY UP TO DATE ON VACCINES

- Influenza & pneumococcal vaccine
  ↓ the incidence of pneumonia

OXYGEN THERAPY

- COPD clients are stimulated to breathe due to ↓ O_2 (if you give too much O_2...they lose their "drive to breathe")
- Healthy clients are stimulated to breath due to ↑ CO_2

Adm. O_2 during exacerbations
or showing signs of respiratory distress

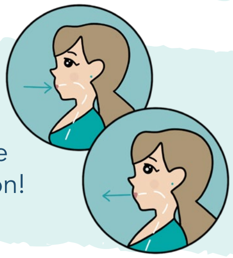
Adm. oxygen with caution to clients with
CHRONIC HYPERCAPNIA (elevated $PaCO_2$ levels)
1 - 2 liters max

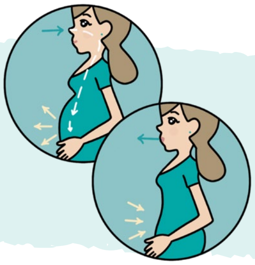
Clients with COPD (especially emphysema) are using a lot of their energy to breathe, therefore burning a lot of calories

small, frequent meals that are rich in **PROTEIN**

PROMOTES CARBON DIOXIDE ELIMINATION

Allows better expiration by ↑ airway pressure that keeps air passages open during exhalation!





We want to use the **DIAPHRAGM** rather than the *accessory muscles* to breathe!

➥ This strengthens the diaphragm and slows down breathing rate

MEDICATION

BRONCHODILATORS

- Relaxes smooth muscle of lung airways = better airflow
- Symbicort (steroid + long-acting bronchodilator)

CORTICOSTEROIDS

- ↓ inflammation (oral, IV, inhaled)
- Example: Prednisone, Solumedrol, Budesonide

SUFFIX:
"-asone"
"-inide"
"-olone"

BUPROPION (ANTI-DEPRESSANT)

ORDER OF EVENTS

① **Bronchodilator**
Dilated airways

② **Corticosteroids**
Airways are open now in order for the steroids to do its job!

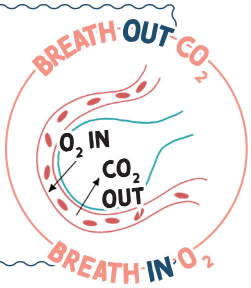
PNEUMONIA

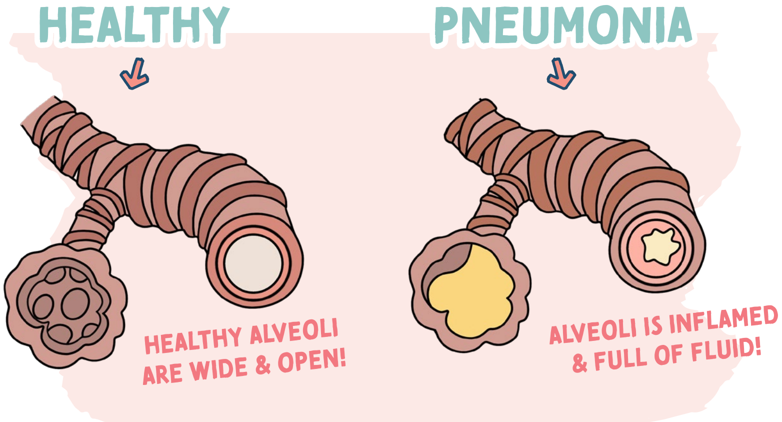
PATHOLOGY

Lower respiratory tract infection that causes inflammation of **ALVEOLI SACS**!

REMEMBER

gas exchange takes place in the alveoli... so pneumonia causes **impaired gas exchange.**




HEALTHY
PNEUMONIA
HEALTHY ALVEOLI ARE WIDE & OPEN!
ALVEOLI IS INFLAMED & FULL OF FLUID!

SYMPTOMS

- ↑ Temperature: **mild** - **high** fever
- ↑ HR
- ↑ RR
  - Attempting to blow off CO$_2$
- ↓ O$_2$ saturation
- Chills
- Chest pain
- Difficulty breathing
- Productive cough
- Unusual breath sounds: coarse crackles & wheezes
- Respiratory acidosis
- ↑ CO$_2$ ↓ O$_2$

INTERVENTIONS

- Monitor...
  - Respiratory status
  - Vital signs: HR, temp, & pulse oximetry
  - Color, consistency & amount of sputum
- Diet
  - ↑ Calorie
  - ↑ Protein
  - ↑ Fluids (oral or IV)
  - Small frequent meals

Thins secretions & compensates dehydration from fever

- Medications
  - Antipyretics
  - Antibiotics *(only for bacteria)*
  - Antivirals
  - Bronchodilators
  - Cough suppressants
  - Mucolytic agents
- Semi Fowler's position

Helps lung expansion

RISK FACTORS

Can be **COMMUNITY-ACQUIRED** or **HOSPITAL-ACQUIRED**!

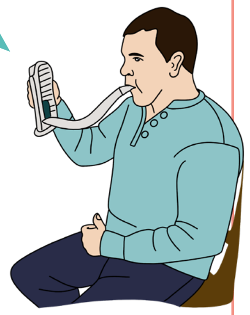
- Prior infection
- Immunocompromised
  - HIV, young/old, auto immune infections
- Postoperative
- Lung diseases
  - COPD
- Immobility
- Aspiration risk

DIAGNOSTIC

- Chest X-ray
  - ↓ *shows pulmonary infiltrates or pleural effusions*
- ↑ White blood cells
- Sputum culture
  - ↓ *can be* BACTERIAL, VIRAL, or FUNGAL

EDUCATE

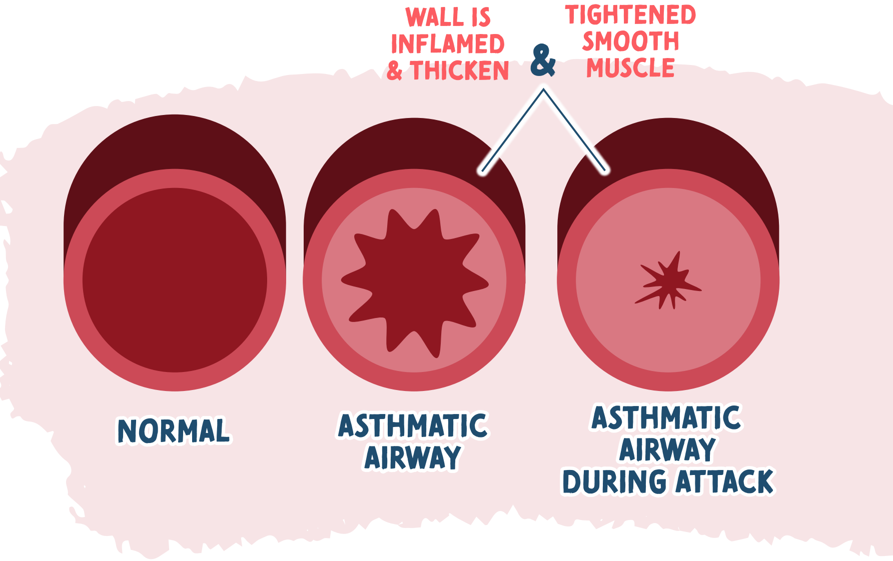
- Use of Inceptive Spirometer
  - Helps to pop open the alveoli sacs & get the air moving
- Up to date vaccines
  - Annual flu shot
  - Pneumococcal vaccine
- Smoking cessation
- Hand washing & avoiding sick people!



ASTHMA

PATHOLOGY

Chronic lung disease that causes an inflamed, narrow, & swollen airway (bronchi & bronchioles)



CAUSES

NOT COMPLETELY KNOWN!

- Genetic
- Environmental
  - Smoke, pollen, perfumes, dust mites, pet dander, cold or dry air, etc.
- GERD
- Exercise-induced asthma
- Certain drugs
  - NSAIDS, aspirin

CLASSIFICATIONS BASED ON SYMPTOMS

MILD INTERMITTENT	MILD PERSISTENT	MODERATE PERSISTENT	SEVERE PERSISTENT
< 2 a week	> 2 a week Not daily	Daily symptoms & exacerbations that happen 2x a week	Continually showing symptoms with frequent exacerbations

SIGNS & SYMPTOMS

CHARACTERIZED BY FLARE-UPS
(meaning: it comes & goes)

- Dyspnea (shortness of breath)
- Tachypnea (fast respiratory rate)
- Chest tightness
- Anxiety
- Wheezing
- Coughing
- Mucus production
- Use of accessory muscles
- **AIR TRAPPING**

Air trapping causes the client to retain CO_2 which is ACIDIC = **RESPIRATORY ACIDOSIS**

NURSING CARE

- Assess client's airway
- High Fowler's position
- Provide frequent rest periods
- Adm. oxygen therapy
  - Goal: keep the O_2 at 95 - 100%
- Maintain a calm environment to ↓ stress
- Asses peak flow meter reading
- Asses for cyanosis & retractions

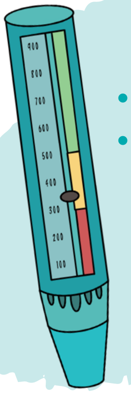
STATUS ASTHMATICUS

Life-threatening asthma episode
Medical emergency!

OXYGEN
↓
HYDRATION
↓
NEBULIZATION
↓
SYSTEMIC CORTICOSTEROID

MEDICATIONS

- BronchoDILATORS
  - Short-acting (Albuterol) → **RAPID RELIEF**
  - Long-acting (Salmeterol) → **PREVENTS ASTHMA ATTACKS**
  - Methylxanthines (Theophylline)
- Corticosteroids
  - Suffix **-ASONE** & **-IDE** → **ANTI-INFLAMMATORY AGENTS**
  - *Ex: Beclomethasone*
- Leukotriene Modifiers
- Anticholinergics



PEAK FLOW METER

- Shows how controlled the asthma is & if it's getting worse
- Establish a baseline by performing a "personal best" reading
  - ➥ Client will exhale as hard as they can & get a reading

GREEN = GOOD
YELLOW = NOT TOO GOOD
RED = BAD

MED-SURG

HEMATOLOGY DISORDERS

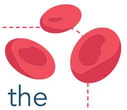
IRON DEFICIENCY ANEMIA

MOST COMMON TYPE OF ANEMIA

PATHOLOGY

TYPE OF ANEMIA CAUSED BY ↓ IRON LEVELS

- Iron is **ESSENTIAL** to hemoglobin in red blood cells.
- The body uses **IRON** to make hemoglobin.
Hemoglobin carries oxygen to the cells!



RED BLOOD CELLS ROLE

Transports O_2 & removes CO_2 from the body with the help of hemoglobin (Hgb)

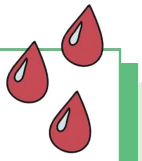
HEMOGLOBIN (HGB)

Found in the RBC's
It's a protein that contains IRON

CAUSES

- Blood loss / hemorrhage
- Malabsorption
- Inadequate dietary intake of iron

SYMPTOMS



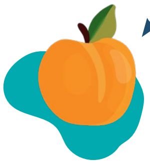
- Pallor
- Weakness & fatigue
- Microcytic (small) red blood cells
- ↓ hemoglobin & ↓ hematocrit

NORMAL VALUES

Hemoglobin (Hgb)
Female: 12 - 16 g/dL *Male:* 13 - 18 g/dL

Hematocrit (HCT)
Female: 36% - 48% *Male:* 39% - 54%

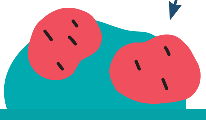
IRON-RICH FOODS



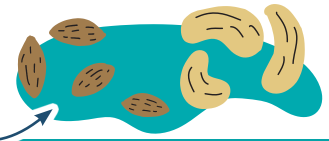
Egg Yolks
Apricots
Tofu

Legumes
Oysters
Tuna
Seeds

P**O**tatoes
Fish



Iron-fortified cereals
Red meats
P**O**ultry
Nuts



INTERVENTIONS

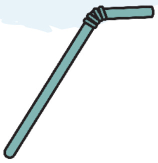
- Diet changes
- ↑ Iron
- ↑ Protein
- ↑ Vitamins
- Administer iron
    - ➥ Oral, IM, or IV
- D/C any damaging drugs
- If active bleed is suspected, identify cause & control bleeding!

Administering Iron Supplements

↓ ABSORPTION	↑ ABSORPTION
Calcium: Milk & antacids	**Vitamin C:** Fruit juice & multivitamin

Liquid iron stains the teeth!

1. Take with a straw



2. Brush teeth after

Side Effects of Iron Supplements

Black stool
Constipation
Foul aftertaste

THROMBOCYTOPENIA

PATHOLOGY

↓ PLATELETS

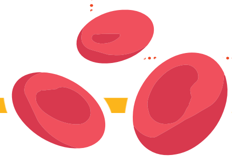
- Platelets help clot the blood
- **Platelet aggregation**
  - ➥ The clumping together of platelets that form a plug at the site of the injury
- ↓ platelets = think **BLEEDING**

Normal Platelet Count

150,000 - 400,000 per microliter

Thrombocytopenia

< 150,000



CAUSES

- **P** latelet disorders
- **L** eukemia
- **A** nemia
- **T** rauma
- **E** nlarged spleen
- **L** iver disease
- **E** thanol (alcohol-induced)
- **T** oxins (drug-induced)
- **S** epsis

SYMPTOMS

- Weakness, dizziness, tachycardia, hypotension
- Prolonged bleeding time
- Petechiae (pinpoint bleeding)
- Purpura (bruising)
- Bleeding from the gums & nose
- Heavy menstrual cycles
- Blood in stool or urine
- ↑ INR & ↑ PT/PTT

DIAGNOSIS

- Bleeding time
- aPTT - Activated partial thromboplastin time
- PT - Prothrombin time
- INR - International normalized ratio
- ↓ Hgb & Hct

NURSING MANAGEMENT

- Platelet transfusion
- Bone marrow transplant
  - Platelets are made in the bone marrow
- Splenectomy
  - For those unresponsive to medical therapy

BLEEDING PRECAUTIONS

- Use electric razors
- NO aspirin
- Use small needle gauges
- Decrease needle sticks
- Protect from injury

IMMUNE THROMBOCYTOPENIC PURPURA (ITP)

Formerly called "idiopathic thrombocytopenia purpura"

PATHOLOGY

Autoimmune disease where the body produces antibodies against its own thrombocytes (Platelets)

"Purpura" is in the name because it causes easy bruising & petechiae in the trunk & extremities!

ITP

< 20,000

CAUSES

- Children after viral illness
- Females (ages 20 - 40)
- Pregnancy

MED-SURG

GASTROINTESTINAL DISORDERS

ACUTE & CHRONIC PANCREATITIS

PATHO

The islets of Langerhans secrete **INSULIN & GLUCAGON** **INTO THE BLOOD STREAM**

Pancreatic tissue: secrete digestive enzymes that break down **CARBOHYDRATES, PROTEINS & FATS**

PANCREATITIS is an **AUTO-DIGESTION** of the pancreas by its own digestive enzymes released too early in the pancreas

LABS

- ↑ Amylase
- ↑ Lipase
- ↑ WBC's
- ↑ Bilirubin
- ↑ Glucose
- ↓ Platelets
- ↓ Ca & Mg

ACUTE VS CHRONIC

ACUTE

Sudden inflammation that is **REVERSIBLE** if prompt recognition and treatment is done

CHRONIC

Chronic inflammation that is **IRREVERSIBLE**

CAUSES

Acute

- **Gallstones**
  - Blocks the bile duct
- **Alcohol (ETOH)**
  - Damages the cells of the pancreas
- **Infection**
- **Medications**
- **Tumor**
- **Trauma**

Chronic

- **Repeated episodes of acute pancreatitis**
- **Excessive & prolonged consumption of alcohol (ETOH)**
  - Recurrent damage to the cells of the pancreas
- **Cystic Fibrosis**

SIGNS & SYMPTOMS

In **ACUTE**, there will still be working functions of the pancreas.

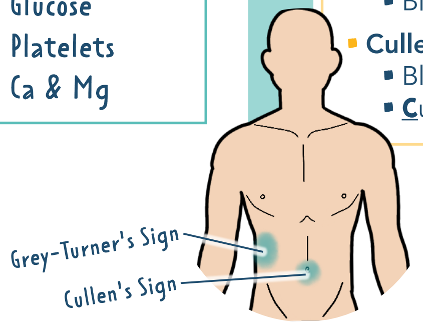
In **CHRONIC**, you will see different S&S due to the prolonged damage & loss of function

Acute

- **Sudden sever PAIN!**
  - Mid-epigastric pain LUQ
- **Nausea & vomiting**
- **Fever**
- **↑ HR & ↓ BP**
- **↑ Glucose**
- **Mental confusion & agitation**
- **Abdominal guarding**
- **Rigid/board-like abdomen**
- **Grey-Turner's Sign**
  - Bluish discoloration at the flanks!
- **Cullen's Sign**
  - Bluish discoloration of the umbilicus
  - Cullens = Circle belly button

Chronic

- **Chronic epigastric pain or no pain**
- **Pain ↑ after drinking ETOH or after a fatty meal**
- **Steatorrhea "fatty stools"**
  - Oily/greasy frothy stool
- **Weight loss**
  - Can't digest food properly
- **Jaundice**
  - Yellowish color of the skin from build up of bile
- **Diabetes Mellitus**
  - Damage to the islet of Langerhans
- **Dark urine**
  - From excess bile in the body



DIGESTIVE ENZYMES (EXOCRINE)

AMYLASE: Breaks down carbs to **glucose**

PROTEASE: Breaks down **proteins**

LIPASE: Breaks down **fats**

DIET

- NO ETOH!
- ↑ protein
- Limit sugars
- ↓ fat (no greasy, fatty foods)
- Complex carbohydrate (fruits, vegetables, grains)

MEDICATIONS

- Opioid analgesics
- Antibiotics
- Pancreatic enzymes
- Insulin
- Proton Pump Inhibitors (PPI's), H2 antagonists, antacids

INTERVENTIONS

- Rest the pancreas!
  - NPO (we don't want stimulation of the enzymes)
- IV fluids
- Pain management
- Positioning
  - Side lying ➜ fetal position, NOT supine!
- Insert NG tube
  - Remove stomach contents

MONITOR

Glucose
Blood pressure
Intake & output
Laboratory values
Stools

INFLAMMATORY BOWEL DISEASE (IBD)

CROHN'S DISEASE

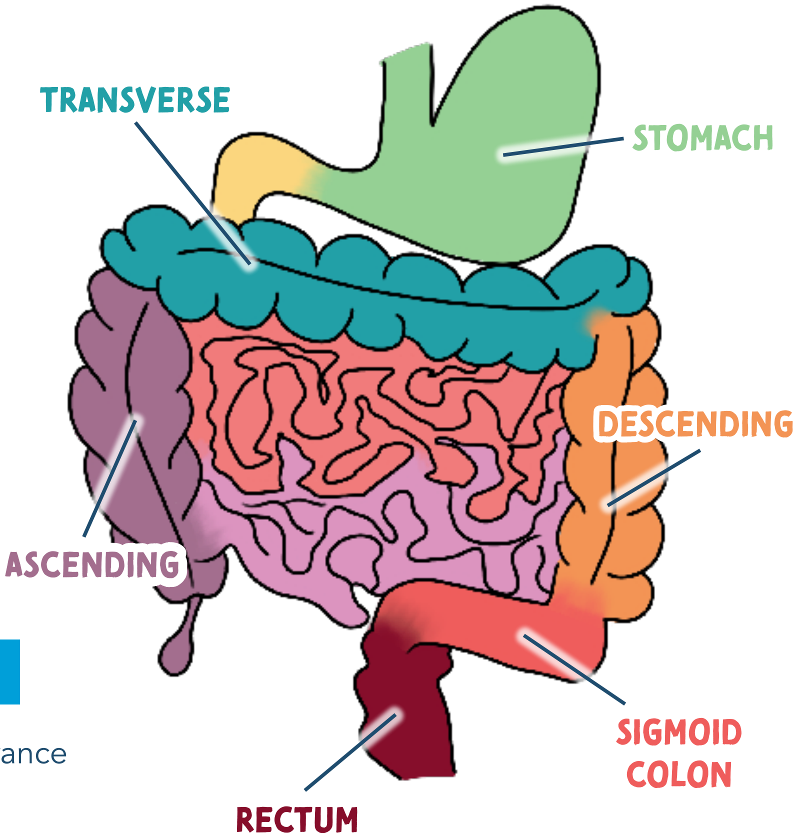
PATHO

Inflammation that occurs anywhere in the GI tract (mouth - anus)

NO CURE!

SIGNS & SYMPTOMS

- Cobble-stone appearance
- Fever
- Cramping after meals
- Mucus like diarrhea (semisolid)
- Abdominal distention
- Nausea & vomiting



ULCERATIVE COLITIS

PATHO

Inflammation & **ulceration** of only the large intestine & rectum

CURE: COLECTOMY WITH ILEOSTOMY

SIGNS & SYMPTOMS

- Ulcers cause
  - Rectal bleeding
  - Bloody diarrhea
  - Abdominal cramping
- ↑ HR & ↓ BP
  - Hypovolemic shock
- Malnutrition
- Malaise
- Dehydration
- Vitamin K deficiency

INTERVENTIONS

FOR THE ACUTE PHASE

NPO

Adm. fluids, electrolytes or parenteral nutrition

DIET

- Clear liquids to ↓ fiber
- ↑ Protein
- Vitamins & iron supplements
- Avoid gas-forming foods

- Dairy
- Whole-wheat grains
- Nuts
- Fruits & vegetables
- Alcohol
- Caffeine

AVOID SMOKING

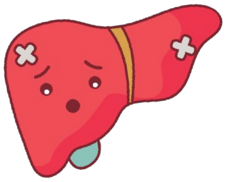
MEDICATIONS

Corticosteroids
Immunosuppressants
Antidiarrheals
Salicylate compounds

MONITOR

- Bowel sounds
  - Bowel perforation
    - Peritonitis
      - Hemorrhage
        - Stool
          - Color
            - Consistency
              - Presence of blood

TYPES OF HEPATITIS



HEPATITIS

HEPAT ↓ LIVER

ITIS ↓ INFLAMMATION

"INFLAMMATION OF THE LIVER"

CAUSED BY:

- VIRAL (A, B, C, D, E) MOST COMMON
- EXCESSIVE USE OF ALCOHOL
- HEPATOTOXIC MEDICATIONS

	TRANSMISSION	SIGNS & SYMPTOMS	DIAGNOSTIC	TREATMENT	VACCINE
HAV ACUTE ONLY	Fecal & oral • Food & water	GI symptoms (N&V, stomach pain, anorexia) Dark-colored urine Clay-colored stool Vomiting Flu-like symptoms Jaundice ↓ **YELLOW DISCOLORATION OF THE SKIN FROM THE BUILDUP OF BILIRUBIN**	Anti-HAV IgM = Active infection IgG = Recovered (It's Gone)	Supportive therapy... REST!	✓
HBV B IS BOTH ACUTE & CHRONIC	B think Body fluids *(Semen, saliva)* • Birth & blood • Childbirth, sex, & IV drugs		HBsAG = Active infection Anti-HBs = Immune / recovery	**ACUTE** Supportive therapy & rest **CHRONIC** Antivirals	✓
HCV ACUTE & CHRONIC	Body fluids • Most common: IV drug users		Anti-HCV No post exposure immunoglobulin	Antivirals Interferon	✗
HDV ACUTE & CHRONIC	Depends on B B & D = BuDs Hep D occurs with Hep B		HDAg Anti-HDV	Antivirals Interferon	✗
HEV ACUTE ONLY	Fecal & oral • Food & water *uncooked meats, 3rd world countries*		Anti-HEV	Supportive therapy... REST!	✗

EDUCATION FOR ALL TYPES OF HEPATITIS!

- Rest
- Diet
- Small frequent meals
- ↑ Carbohydrates
- ↑ Calories
- ↓ Protein & fat
- Proper hand hygiene
- Do not share personal hygiene products
- Avoid sex until hepatitis antibodies are negative
- Educate on toxic substances to avoid
- Alcohol, acetaminophen, aspirin, sedatives

LABS:

Liver enzymes
ALT: 7 - 56 U/L
AST: 5 - 40 U/L

Bilirubin: <1 mg/dL

Ammonia: 15 - 45 mcg/dL

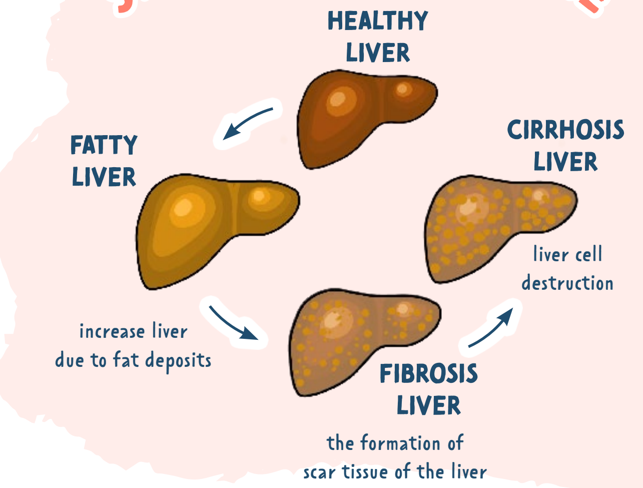
ALL WILL BE ELEVATED IN HEPATITIS

CIRRHOSIS

FUNCTIONS OF A HEALTHY LIVER

1. **DETOX THE BODY**
2. **HELPS TO CLOT THE BLOOD**
3. **HELPS TO METABOLIZE (BREAKDOWN) DRUGS**
4. **SYNTHESIS (MAKES) ALBUMIN**

STAGES OF LIVER DAMAGE


HEALTHY LIVER
FATTY LIVER
increase liver due to fat deposits
FIBROSIS LIVER
the formation of scar tissue of the liver
CIRRHOSIS LIVER
liver cell destruction

PATHOLOGY

Liver cells are **DESTROYED** and replaced with fibrotic (scar) tissue.

Loss of normal function of the liver.

CAUSES

- ETOH consumption
- Nonalcoholic fatty liver disease (NAFLD)
  - Viral hepatitis B & C
  - Autoimmune
  - Hepatotoxic drugs
  - Toxins & parasites
  - Fat collection in the liver (obesity, diabetes, ↑ cholesterol)

SIGNS & SYMPTOMS

- Asterixis
  - *Liver flap*
- Jaundice
  - Yellow discoloration in the eyes & skin
- Ascites
- Edema
- Abdominal pain
- Chronic dyspepsia (GI upset)
- Itchy skin
- ↑ Bilirubin & ammonia
- ↓ Platelets
  - Risk for bleeding
- ↓ WBC's
  - Risk for infection

COMPLICATIONS

- Portal HTN
  - Portal veins become narrow due to scar tissue
- GI bleeding (esophageal varices)
- Splenomegaly
- Anemia
- Hepatic encephalopathy/coma
  - Due to ↑ ammonia levels (ammonia is a sedative)
- Gynecomastia
  - Breast development in men
- Hepatorenal Syndrome
  - Acute kidney injury *in clients with liver failure*

TREATMENT

- No more alcohol
- Rest
- Prevent bleeding
  - Bleeding precautions
- Measure abdominal girth
- Daily weights & I&O's
- Paracentesis
  - Removal of fluid from the peritoneal cavity (ascites)
- Liver transplant

- Electric razor
- Soft-bristled tooth brush
- Pressure on all venipuncture

MEDICATIONS

THE LIVER CAN'T METABOLIZE DRUGS WELL WHEN IT'S SICK

- Antacids
- Vitamins
- Diuretics
- Lactulose
  - ↓ serum ammonia through the stool
- Avoid narcotics

DO NOT GIVE ACETAMINOPHEN TO PEOPLE WITH LIVER ISSUES!

MED-SURG

NEUROLOGICAL DISORDERS

NEUROLOGICAL ASSESSMENTS

LEVEL OF CONSCIOUSNESS (LOC)

Level of CONSCIOUSNESS (LOC) is always **#1** with neurological assessment

A change in LOC may be the only sign that there is a PROBLEM!

PUPILLARY CHANGES

PERRLA

Pupils, **E**qual, **R**ound, **R**eactive to **L**ight & **A**ccommodation

NORMAL PUPIL SIZE : 2 - 6 mm

GLASGOW COMA SCALE

TOOL FOR ASSESSING A CLIENT'S RESPONSE TO STIMULI

EYE OPENING RESPONSE	Spontaneous	4
	To speech	3
	To pain	2
	No response	1
VERBAL RESPONSE	Oriented	5
	Confused	4
	Inappropriate words	3
	Unclear sounds	2
	None	1
MOTOR RESPONSE	Obeys command	6
	Localizes pain	5
	Withdraws	4
	Flexion	3
	Extension	2
	None	1
TOTAL	**3 - 15**	

INTERPRETATION

WORST **3** Severe impairment of neurological function, coma, or brain death

<8 Unconscious patient

BEST **15** Fully alert & oriented

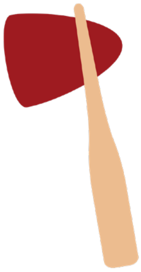
MENTAL STATUS

- ARE THEY AWARE OF THEIR SURROUNDINGS?
- ARE THEY ORIENTED TO PERSON, PLACE, TIME, & SITUATION?
- DO THEY HAVE THEIR SHORT TERM & LONG TERM MEMORY?

Ask these types of questions to assess mental status:

- What is your name?
- Do you know where you are?
- Do you know what month it is?
- Who is the current U.S. president?
- What are you doing here?

DEEP TENDON REFLEX (DTR) RESPONSES



0 = No response ABSENT

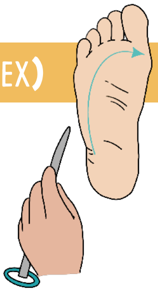
1+ = Present, but sluggish or diminished

2+ = Active or expected response NORMAL

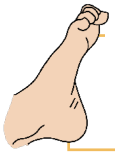
3+ = More brisk than excited; Hyperactive

4+ = Brisk, Hyperactive, with intermittent, or transient clonus

BABINSKI REFLEX (PLANTAR REFLEX)

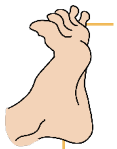


ELICITED BY STROKING THE LATERAL SIDE OF THE FOOT



INTACT CNS

The lateral sole of the foot is stroked and the toes contract & draw together.



BRAIN DYSFUNCTION

Toes fan out when stroked.

Remember this is only normal in newborns & infants up to 2 years of age, but abnormal in adults!

Babinski think: Normal in **B**abies & the **B**ig toe fans out

SEIZURES

WHAT IS A SEIZURE? Abnormal & sudden electrical activity of the brain

WHAT IS EPILEPSY? Chronic seizure activity due to a chronic condition

CAUSES

- ↑ fever
  (Febrile seizure in child)
- CNS infection
- Drug or alcohol withdrawal
- ABG imbalance
- Hypoxia
- Brain tumor
- Hypoglycemia
- Head injury
- Hypertension

STAGES OF A SEIZURE

PRODROMAL

When symptoms start before the actual seizure

(can be days before the seizure happens)

→

AURA

Warning sign right before the seizure happens:

- Weird smell or taste
- Altered vision
- Dizzy

NOT ALL CLIENTS EXPERIENCE AN AURA

→

⚠ ICTUS ⚠

SEIZURE!

Status Epilepticus: a seizure that lasts >5 minutes without any consciousness during the seizure

→

POST -ICTUS

Recovery after the seizure

- Headache
- Possible injury
- Confusion
- Very tired

GENERALIZED SEIZURES

THE ENTIRE BRAIN IS AFFECTED

TONIC-CLONIC	"Used to be called grand-mal" May begin with an aura. Stiffening (tonic) and/or rigidity (clonic) of the muscles.
MYOCLONIC	Sudden jerking or stiffening of the extremities (arms or legs).
ABSENCE	Usually looks like a blank stare that lasts seconds. Often goes unnoticed
ATONIC	Sudden loss of muscle tone. May lead to sudden falls or dropping things.

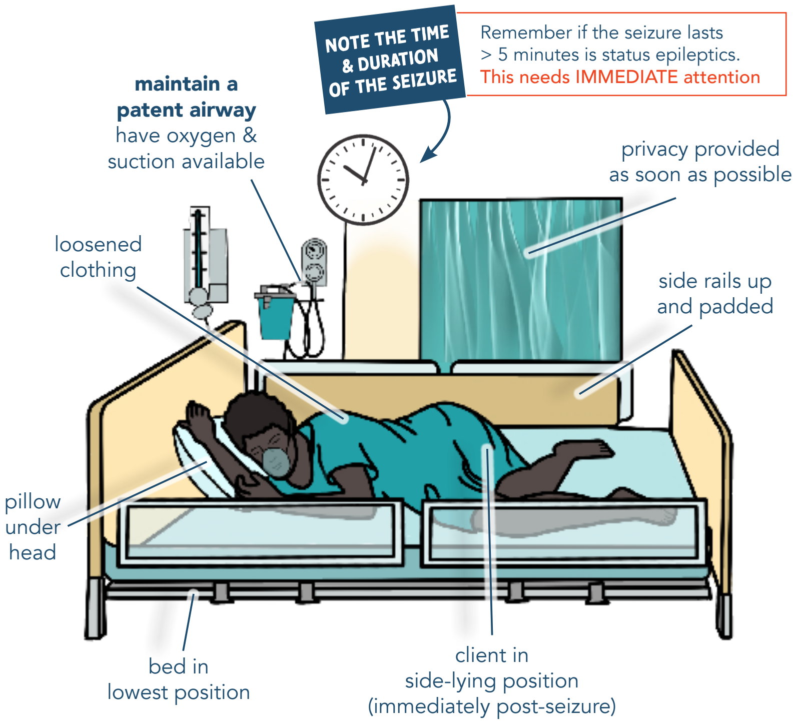
PARTIAL (FOCAL) SEIZURES

ONE AREA OF THE BRAIN IS AFFECTED

SIMPLE PARTIAL	Sensory symptoms with motor symptoms and stays aware. They may report an aura.
COMPLEX PARTIAL	Altered behavior/awareness and loses consciousness for a few seconds.

CARE DURING THE SEIZURE

SEIZURE PRECAUTIONS


NOTE THE TIME & DURATION OF THE SEIZURE
maintain a patent airway
have oxygen & suction available
privacy provided as soon as possible
loosened clothing
side rails up and padded
pillow under head
bed in lowest position
client in side-lying position (immediately post-seizure)

Remember if the seizure lasts > 5 minutes is status epileptics.
This needs IMMEDIATE attention

DON'T

- Restrain the client
- Force the jaw open
- Place anything in their mouths
- Leave the client

CEREBROVASCULAR ACCIDENT (CVA) "STROKE"

ISCHEMIC STROKE

BLOCKAGE

"Thrombotic or embolic"

THROMBOSIS: blood clot that formed on the artery wall

EMBOLISM: A clot has left part of the body

Blood flow is cut off which leads to **ISCHEMIA**.

TRANSIENT ISCHEMIC ATTACKS: "TIA'S"
"Mini strokes"
The same pathology as a stroke but no cerebral infarction occurs

HEMORRHAGIC STROKE

BLEEDING

RUPTURED ARTERY

ANEURYSM (weakening of the vessel)

UNCONTROLLED HYPERTENSION

The collection of blood in the brain leads to ischemia & increased ICP

TREATMENT

FIBRINOLYTIC THERAPY

(TPA) TISSUE PLASMINOGEN ACTIVATOR

DISSOLVES DOWN THE BLOOD CLOT!

- Avoid IM injections
- Avoid unnecessary IV punctures
- Prevent injury (bed rest)
- Check for bleeding

STOP THE BLEEDING PREVENT INCREASED ICP

- Poor prognosis
- Needs careful monitoring in an intensive care unit
- Blood may need to be removed to ↓ pressure on the brain

SIGNS & SYMPTOMS

REMEMBER!
If the stroke occurs on the left side of the brain, the right side of the body will be affected

Face drooping
- Uneven smile

Arm weakness
- Arm numbness; can't lift arm

Speech difficulty
- Slurred speech

Time to call 911

TYPES OF APHASIA

RECEPTIVE
Unable to comprehend speech
(WERNICKE'S AREA)

EXPRESSIVE
Can comprehend speech (but can't respond back with speech)
(BROCA'S AREA)

RISK FACTORS

MODIFIABLE

- Hypertension
- Atherosclerosis
- Anticoagulation therapy
- Diabetes Mellitus
- Obesity
- Stress
- Oral contraceptives

NON-MODIFIABLE

- Family history of strokes
- Older age
- Male gender
- Black
- Hispanic

NURSING MANAGEMENT

- Assist with safe feeding
  - Do not feed until gag reflex has come back
  - ↓ chances of aspiration
  - Keep suction at the bedside
  - Crush medications

LIQUID
- Thin
- Nectar-like
- Honey-like
- Spoon-thick

FOOD
- Pureed
- Mechanically altered
- Mechanically softened
- Regular

- Positioning of the client
  - Elevate head of the bed to ↓ ICP
  - Place a pillow under the affected arm in a neutral position

- Assist with communication skills
- Encourage passive range of motion every 2 hours
- Preventative DVT measures
- Assist with Activities of Daily Living (ADL's)
- Communication
  - Be patient
  - Make clear statements
  - Ask simple questions
  - Don't rush!

PREVENTATIVE DVT MEASURES
- Compression stockings
- Frequent position change
- Mobilization

- Frequent rest periods
- Dress the affected side first
- Support affected side

CRANIAL NERVES

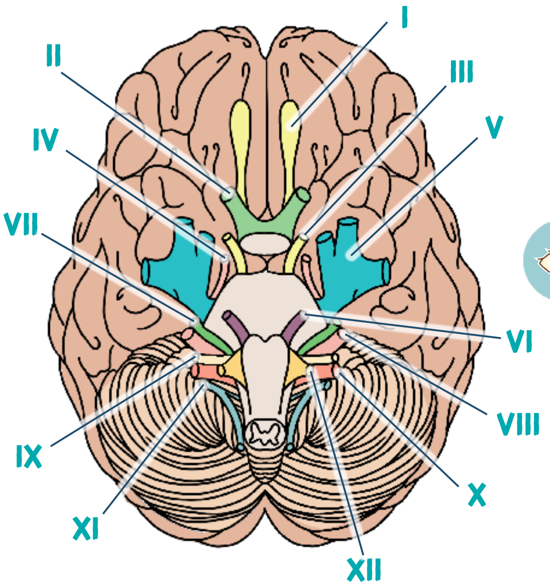
WHAT ARE CRANIAL NERVES?

Nerves that originate from the brain stem.
They send information to & from various parts of the body.

SE SENSORY
M MOTOR
B BOTH

MNEMONICS

Ooh,	**O**lfactory	**S**ome	**S**ensory
Ooh,	**O**ptic	**S**ay	**S**ensory
Ooh	**O**culomotor	**M**arry	**M**otor
To	**T**rochlear	**M**oney	**M**otor
Touch	**T**rigeminal	**B**ut	**B**oth
And	**A**bducens	**M**y	**M**otor
Feel	**F**acil	**B**rother	**B**oth
Very	**V**estibulocochlear / **A**coustic	**S**ays	**S**ensory
Good	**G**lossopharyngeal	**B**ig	**B**oth
Velvet.	**V**agus	**B**rains	**B**oth
Such	**S**pinal Accessory	**M**atter	**M**otor
Heaven!	**H**ypoglossal	**M**ore	**M**otor



START

I: OLFACTORY SE

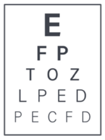
FUNCTION:
Sense of smell

TEST:
Smell substance with eyes closed (test each nostril separately)

II: OPTIC SE

FUNCTION:
Vision

TEST:
- Snellen chart
- Ophthalmoscopic exam
- Confrontation to check peripheral vision



III: OCULOMOTOR M

FUNCTION:
Ocular (eye) motor (movement)
Controls most eye movements, pupil constriction, & upper-eyelid rise

TEST:
- Look up, down, & inward
- Ask the client to follow your finger as you move it towards their face

IV: TROCHLEAR M

FUNCTION:
Controls downward & inward eye movement

TEST:
- Look up, down, & inward
- Ask the client to follow your finger as you move it towards their face

V: TRIGEMINAL B

FUNCTION:
MOTOR - Mastication (biting & chewing)
SENSORY - Facial sensation

TEST:
- Pressure on the forehead cheek & jaw with a cotton swab to check sensation
- Ask client to open mouth & then bite down

VI: ABDUCENS M

FUNCTION:
Controls parallel eye movement
Abduction - moving laterally
AKA away from midline

TEST:
- Look up, down, & inward
- Ask the client to follow your finger as you move it towards their face

VII: FACIAL B

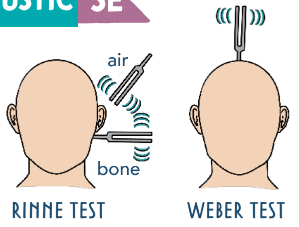
FUNCTION:
MOTOR - Facial expression
SENSORY - Taste (sweet & salty)

TEST:
- Ask client to do different facial expression (Frown, smile, raise eyebrows, close eyes, blow etc)
- Test tongue by giving client sour, sweet, bitter, and salty substances.

VIII: VESTIBULOCOCHLEAR / ACOUSTIC SE

FUNCTION:
Balance & hearing

TEST:
- Stand with eyes closed
- Otoscopic exam
- Rinne & Weber Tests



IX: GLOSSOPHARYNGEAL B

GLOSSO MEANS TONGUE!

FUNCTION:
MOTOR - Tongue movement & swallowing
SENSORY - Taste (sour & bitter)

TEST:
Test tongue by giving client sour, bitter, & salty substance.

X: VAGUS B

FUNCTION:
MOTOR - Swallowing, speaking, & cough
SENSORY - Facial sensation

TEST:
Sensation coming from skin around the ear

XI: SPINAL ACCESSORY M

FUNCTION:
Controls strength of neck & shoulder muscles

TEST:
Ask the client to rotate their head & shrug their shoulders

XII: HYPOGLOSSAL M

GLOSSO MEANS TONGUE!

FUNCTION:
Tongue movement (swallowing & speech)

TEST:
Inspect tongue & ask to stick tongue out

MED-SURG

BURNS

BURNS

WHAT IS A BURN?
Damage to skin integrity

TYPES OF BURNS

THERMAL
most common

Superficial heat
Examples: liquid, steam, fire

CHEMICAL

Burn caused by a toxic substance
Can be Alkali or Acidic
Examples: bleach, gasoline, paint thinner

RADIATION

Sunburns (UV radiation)
& cancer treatment (radiation therapy)

INHALATION

Caused by inhaling smoke which can cause flame injury or carbon monoxide poisoning

FRICTION

Burn caused when an object rubs off the skin
Examples: road rash, scrapes, carpet burn

COLD

Skin has been overexposed to cold
Example: frostbite

ELECTRIC

Electrical current that passes through the body causing damage within

POTENTIAL COMPLICATIONS
Dysrhythmias, Fracture of bones.
Release of **myoglobin & hemoglobin** into the blood which can clog the kidneys.

BURNS INJURY DEPTH

1st Degree SUPERFICIAL

- Epidermis
- Pink & painful (still has nerves)
- No scarring
- Blanching: present
- Heals: few days

2nd Degree SUPERFICIAL PARTIAL THICKNESS

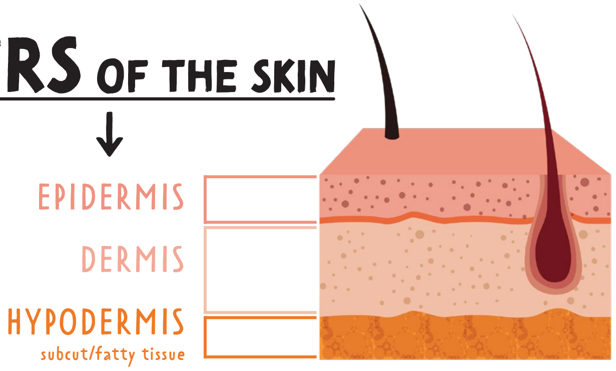
- Epidermis & dermis
- Blisters, shiny, & moist
- Painful
- Blanching: present
- Heals: 2 - 6 weeks

3rd Degree FULL THICKNESS

- Epidermis, dermis, & hypodermis
- May look black, yellow, red & wet
- No pain/ limited pain (nerve fibers are destroyed)
- Skin will not heal (need skin grafting)
- **Eschar**: dead tissue, leathery; must be removed!

LAYERS OF THE SKIN

↓



BURN LOCATION

RESPIRATORY
- Face
- Neck
- Chest
- Torso

DISABILITY
- Hands
- Feet
- Joints
- Eyes

TROUBLE HEALING
- Poor blood supply
- Diabetes
- Infection

INFECTION
Any open area where bacteria can easily enter
- Perineum
- Ears
- Eyes

COMPARTMENT SYNDROME
- In the extremities
  Tight skin such as eschar acting like a band around the skin cutting off blood circulation

INHALATION INJURY

Damage to the respiratory system!
Happens mostly in a **closed area**

SIGNS OF INHALATION INJURY

Hair singed
around the face, neck or torso

Trouble talking

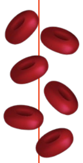
Soot in the nose or mouth

Confusion or anxiety

CARBON MONOXIDE (CO) POISONING

Carbon monoxide travels faster than oxygen, making it bind to hgb first.

Now oxygen cannot bind to hgb = **HYPOXIC**



Classic symptom: cherry red skin
Treatment: 100% O2

NOTE:
Oxygen saturation may appear normal

PHASES OF BURN MANAGEMENT

EMERGENT PHASE

Onset of Injury to the restoration of capillary permeability

24 - 48 HOURS
after burn

PATHO

↑ Capillary permeability (leaky vessels) causing:

- Plasma leaves the intravascular space
  - Albumin & sodium follows
- Fluids shift to the interstitial tissue

LEADS TO EDEMA

LEADS TO FLUIDS VOLUME DEFICIT (FVD) IN THE INTRAVASCULAR SPACE

VITAL SIGNS

↑ Pulse
↓ Blood pressure
↓ Cardiac output

THINK: HYPOVOLEMIC SHOCK!

↓ Urine output
(from ↓ perfusion to the kidneys)

LABS

↑ Potassium (K+)
↑ Hematocrit (HCT)
↓ White Blood Cells (WBC's)
↑ BUN/Creatine

NURSING CONSIDERATIONS

- Establish IV access *(preferrably 2)*
- Fluids (Lactated Ringer's, crystalloids)
- Parkland formula
- Foley catheter to monitor urinary output (UOP)
  - Goal: > 30 mL/hr of UOP
- Decrease edema
  - Elevate extremities above heart level

THINK: ABC's

ACUTE PHASE

Capillary permeability stabilized - to wound closure

48 - 72 HOURS
after burn & until wounds have healed

PATHO

Capillary permeability is restored which leads to the body diuresing (increased urine production). All the excess fluid that shifted from the interstitial tissue shifts back into the intravascular space.

GOALS

- Prevent infection
  - Systemic antibiotic therapy
- Ensure proper nutrition
  - Needs ↑ calories
  - Protein & Vit C to promote healing
- Alleviate pain
- Wound care
  - Always premedicate before wound care!
  - Debridement or grafting

NURSING CONSIDERATIONS

- Renal
  - Diuresis is happening
  - Foley catheter to monitor UOP
- Respiratory
  - Possible intubation if respiratory complications occurred
- Gastrointestinal
  - Since the client is in FVD, there is ↓ perfusion to the stomach
    - Paralytic ileus
    - Curlings ulcer
  - Medication to decrease chance of ulcers
    - H2 histamine blocking agent (↓HCl)
  - Monitor bowel sounds
  - May need NG tube for suctioning

REHABILITATIVE PHASE

Burn healed and the patient is functioning mentally & physically

GOALS

- Psychosocial
- Activities of daily living (ADL's)
- Physical therapy (PT)
- Occupational theory (OT)
- Cosmetic corrections

FLUID RESUSCITATION FOR BURNS

THE PARKLAND FORMULA

Used to calculate the total volume of fluids (mL) that a patient needs **24 hours** after experiencing a burn

Apply only in 2nd & 3rd degree burns.

4 mL X TBSA (%) X Body Weight (kg) = total mL of fluid needed

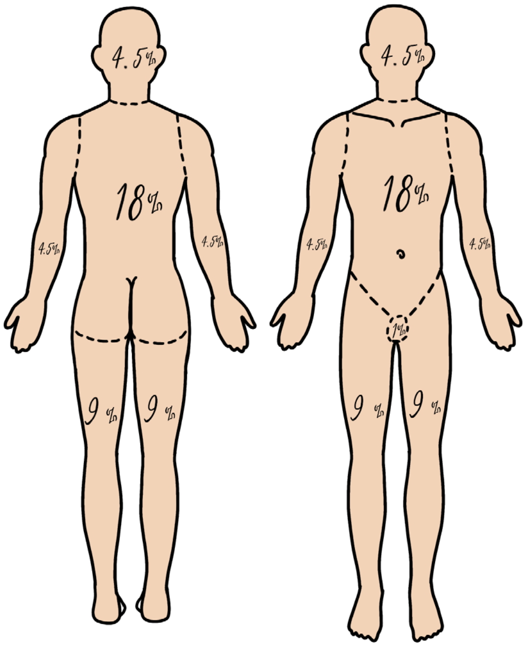
Give half of the solution for the **FIRST 8 HOURS**

Give half of the solution for the **NEXT 16 HOURS**

RULE OF NINES

Quick estimate of the % of the **total body surface area (TBSA)** has been effected by a partial & full-thickness burn in an adult client.

RULE OF NINES



PRACTICE QUESTION

PART 1

A 25 year old male patient who weighs 79 kg has sustained burns to the back of the right arm, posterior trunk, front of the left leg, and their anterior head and neck. Using the **Rule of Nines**, calculate the total body surface area percentage that is burned.

Back of right arm - 4.5%
Posterior trunk - 18%
Front of left leg - 9%
Anterior head & neck- 4.5%

ANSWER:
36%

PART 2

Use the Parkland formula to calculate the total amount of Lactated Ringer's solution that will be given over the next 24 hours.

ANSWER:
11,376 mL

NOTE:
The formula uses TBSA (%). However, you must calculate using 36. Not 0.36 (also written as 36%).

4 mL X 36% X 79 kg = 11,376 mL

10,360 / 2 = **5,688 mL**
FIRST 8 HOURS

10,360 / 2 = **5,688 mL**
NEXT 16 HOURS

Keep in mind: the question could ask you for mL given in the first 24 hours, the first 8 hours, etc., so read the question carefully.

ARTERIAL

BLOOD GASES (ABG's)

ABG's

ABG → ARTERIAL

A**B**G → BLOOD

AB**G** → GAS

ABG's MEASURE HOW ACIDIC OR ALKALOTIC THE BLOOD IS IN THE ARTERIAL CIRCULATION.

(ALSO A MEASURE OF GASES SUCH AS O_2 & CO_2)

4 MUST-KNOW COMPONENTS

PH	MEASUREMENT OF HOW ACIDIC OR ALKALOTIC YOUR BLOOD IS	REGULATED BY BOTH LUNGS & KIDNEYS	7.35 - 7.45
$PACO_2$	MEASUREMENT OF CARBON DIOXIDE IN THE BLOOD CO_2 think aCid	REGULATED BY THE LUNGS	35 - 45
HCO_3	MEASUREMENT OF BICARBONATE IN THE BLOOD Bicarbonate think Base	REGULATED BY THE KIDNEYS	22 - 26
PAO_2	MEASUREMENT OF OXYGEN IN THE BLOOD	REGULATED BY THE LUNGS	80 - 100

Value not needed to interpret alkalosis or acidosis. It just tells you if the patient is hypoxic or not.

ABG INTERPRETATION

1 KNOW YOUR LAB VALUES!

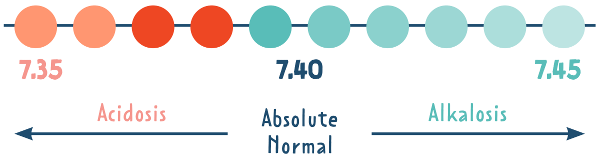
	ACIDOSIS	NORMAL	ALKALOSIS
PH	< 7.35	7.35 - 7.45	> 7.45
CO_2	> 45	35 - 45	< 35
HCO_3	< 22	22 - 26	> 26

2 RESPIRATORY OR A METABOLIC PROBLEM?

Respiratory	PH ↑	CO_2 ↓	Alkalosis
Opposite	PH ↓	CO_2 ↑	Acidosis
Metabolic	PH ↑	HCO_3 ↑	Alkalosis
Equal	PH ↓	HCO_3 ↓	Acidosis

3 UNCOMPENSATED, PARTIALLY COMPENSATED, OR FULLY COMPENSATED?

LOOK AT THE PH



- If the pH is out of range & CO_2 or HCO_3 is in range = **UNCOMPENSATED**
- If CO_2 & HCO_3 are BOTH out of range & the PH is out of range = **PARTIALLY COMPENSATED**
- If PH is in range (7.35 - 7.45) = **FULLY COMPENSATED**

HOW DO THE ORGANS COMPENSATE?

KIDNEYS

BICARB
HYDROGEN

B THINK BASE

Excreting excess
ACID & **BICARB (HCO_3)**
OR
Retaining
HYDROGEN & **BICARB (HCO_3)**

hours - days to compensate

LUNGS

CO_2 THINK ACID

HYPERventilation
=
↓ CO_2 = **ALKALOSIS**

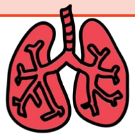
HYPOventilation
=
↑ CO_2 = **ACIDOSIS**

compensates FAST!

RESPIRATORY ACIDOSIS VS. RESPIRATORY ALKALOSIS

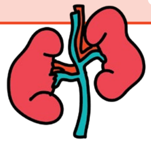
RESPIRATORY ACIDOSIS

PATHOPHYSIOLOGY



LUNG PROBLEM

The lungs are **RETAINING** too much **CO_2**



KIDNEYS COMPENSATE

The kidneys excrete excess **HYDROGEN** & retain **BICARB** (HCO_3)

PH	CO_2
< 7.35	> 45

CAUSES

RETAINING CO_2: "DEPRESS" BREATHING

- **D**rugs (opioids & sedatives)
- **E**dema (fluid in the lungs)
- **P**neumonia (excess mucus in the lungs)
- **R**espirtory center of the brain is damaged
- **E**mboli (pulmonary emboli)
- **S**pasms of the bronchial (asthma)
- **S**ac elasticity damage (COPD & emphysema)

All these things cause impared gas exchange

SIGNS & SYMPTOMS

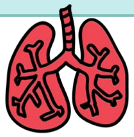
- ↓ Blood pressure
- ↓ Respiration rate
- ↑ Heart rate
- Restlessness
- Confusion
- Headache
- Sleepy / coma

INTERVENTIONS

- Administer O_2
- Semi-Fowler's position
- Turn, cough, & deep-breathe (TCDB)
- Pneumonia: ↑ fluids to thin secretions & administer antibiotics
- Monitor potassium levels (normal 3.5 - 5.0 mmol/L)
- If CO_2 >50, they may need an endotracheal tube

RESPIRATORY ALKALOSIS

PATHOPHYSIOLOGY



LUNG PROBLEM

The lungs are **LOSING** too much **CO_2**

KIDNEYS COMPENSATE

The kidneys excrete excess **BICARB** (HCO_3) & retain **HYDROGEN**

PH	CO_2
> 7.35	< 35

CAUSES

LOSING CO_2: "TACHYPNEA"

↑ Temperature

Aspirin toxicity

Hyperventilation

SIGNS & SYMPTOMS

- Respiratory rate >20
- ↑ Heart rate
- Confused & tired
- Tetany
- EKG changes
- (+) Chvostek sign

Twitching of the facial muscles when tapping the facial nerve in response to hypocalcemia

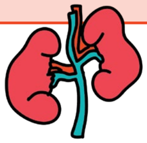
INTERVENTIONS

- Provide emotional support
- Fix the breathing problem!
- Encourage good breathing patterns
- Rebreathing into a paper bag
- Give anti-anxiety medications or sedatives to ↓ breathing rate
- Monitor K+ & Ca- levels

METABOLIC ACIDOSIS VS. METABOLIC ALKALOSIS

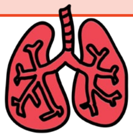
METABOLIC ACIDOSIS

PATHOPHYSIOLOGY



KIDNEY PROBLEM

Too much **HYDROGEN**
Too little **BICARB** (HCO_3)



LUNGS COMPENSATE

The lungs will blow off **CO_2**

PH	HCO_3
< 7.35	< 22

CAUSES

- Diabetic ketoacidosis → Not enough insulin = ↑ fat metabolism = excess ketones (acid)
- Acute/chronic kidney injury
- Malnutrition → Breaking down of fats = excess ketones (acid)
- Severe diarrhea → Remember Bicarb comes out of your Base

SIGNS & SYMPTOMS

- Kussmaul's breathing → Deep rapid breathing >20 breaths per minute
- Hyperkalemia
  - Muscle twitching
  - Weakness
  - Arrhythmias
- ↓ Blood pressure
- Confusion

INTERVENTIONS

- Monitor intake & output
- Administer IV solution to ↑ bases & ↓ acids
- Initiate seizure precaution
- Monitor K+ levels

DIABETIC KETOACIDOSIS (DKA)

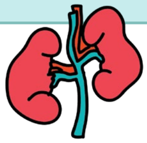
- **Give insulin** (this stops the breakdown of fats which stops ketones from being produced)
- **Monitor for hypovolemia due to polyuria**

KIDNEY DISEASE

- Dialysis to remove toxins
- Diet
  - ↑ Calories
  - ↓ Protein

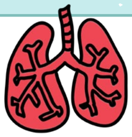
METABOLIC ALKALOSIS

PATHOPHYSIOLOGY



KIDNEY PROBLEM

Too much **BICARB** (HCO_3)
Too little **HYDROGEN**



LUNGS COMPENSATE

The lungs will retain **CO_2**

PH	HCO_3
> 7.45	> 26

CAUSES

- Too many antacids → Too much sodium bicarbonate (BASE)
- Diuretics
- Excess vomiting → Excess loss of hydrochloric acid (HCL) from the stomach
- Hyperaldosteronism

SIGNS & SYMPTOMS

- Hypoventilation <12 breaths per minute
- Low potassium (K+)
  - Dysrhythmias
  - Muscle cramps/weakness
  - Vomiting
  - Tetany
  - Tremors
  - EKG changes

INTERVENTIONS

- Monitor potassium & calcium levels
- Administer IV fluids to help the kidneys get rid of bicarbonate
- Replace K+
- Give antiemetics for vomiting (Zofran or Phenergan)
- Watch for signs of respiratory distress

Metabolic **ACIDOSIS** = ↑ serum potassium
Metabolic **ALKALOSIS** = ↓ serum potassium

PHARMACOLOGY

Suffixes, Prefixes, & Antidotes

ANTIBIOTICS / ANTIBACTERIALS

Broad spectrum antibiotics	**-OXACIN**
Tetracyclines	**-CYCLINE**
Sulfonamides	**SULF-**
Cephalosporins	**-CEF CEPH-**
Penicillins	**-CILLIN**
Aminoglycosides & macrolides	**-MYCIN**
Fluoroquinolones	**-FLOXACIN**

ANTIVIRALS

Antiviral (disrupts viral maturation)	**-VIRIMAT**
Antiviral (undefined group)	**VIR- -VIR- -VIR**
Antiviral (neuraminidase inhibitors)	**-AMIVIR**
Antiviral (acyclovir)	**-CYCLOVIR**
HIV protease inhibitors	**-NAVIR**
HIV / AIDS	**-VUDINE**

ANTIFUNGAL

Antifungal	**-AZOLE**

ANESTHETICS / ANTIANXIETY

Local anesthetics	**-CAINE**
Barbiturates (CNS depressant)	**-BARBITAL**
Benzodiazepines (for anxiety/sedation)	**-ZOLAM**
Benzodiazepines (for anxiety/sedation)	**-ZEPAM**

ANTIDIABETIC

Oral hypoglycemics	**-IDE -TIDE -LINIDE**
Inhibitor of the DPP-4 enzyme	**-GLIPTIN**
Thiazolidinedione	**-GLITAZONE**

CARDIAC

ANTIHYPERTENSIVES

ACE inhibitors	-PRIL
Beta-blockers	-OLOL
Angiotensin II receptor antagonists	-SARTAN
Calcium channel blockers	-PINE -AMIL
Vasopressin receptor antagonists	-VAPTAN
Alpha-1 blockers	-OSIN
Loop diuretics	-IDE -SEMIDE
Thiazide diuretics	-THIAZIDE
Potassium sparing diuretics	-ACTONE

ANTIHYPERLIPIDEMICS

HMG-CoA reductase inhibitor	-STATIN

OTHER

Anticoagulant (Factor Xa inhibit)	-XABAN
Anticoagulants (Dicumarol type)	-AROL
Anticoagulants (Hirudin type)	-IRUDIN
Low-molecular-weight heparin (LMWH)	-PARIN
Thrombolytics (clot-buster)	-TEPLASE -ASE
Antiarrhythmics	-ARONE

ANALGESICS / OPIOIDS

Opioids	-DONE
Opioids	-ONE
NSAID's (anti-inflammatory)	-OLAC -PROFEN
Salicylates	ASPRIN (ASA)
Nonsalicylates	ACETAMINOPHEN

GASTROINTESTINAL

Histamine H2 antagonists (H2-blockers)	-TIDINE -DINE
Proton pump inhibitor (PPIs)	-PRAZOLE
Laxatives	-LAX

ANTIDEPRESSANTS

Selective serotonin reuptake inhibitors (SSRIs)	**-OXETINE** **-TALOPRAM** **-ZODONE**
Serotonin-norepinephrine reuptake inhibitors (SNRI/DNRI)	**-FAXINE -ZODONE** **-NACIPRAM**
Tricyclic antidepressants (TCAs)	**-TRIPTYLINE** **-PRAMINE**

MISCELLANEOUS

Corticosteroids	**-ASONE -OLONE -INIDE**
Triptans (anti-migraine)	**-TRIPTAN**
Ergotamines (anti-migraine)	**-ERGOT-**
Antiseptics	**-CHLORO**
Antituberculars (TB)	**RIFA-**
Bisphosphonates	**-DRONATE**
Neuromuscular blockers	**-NUIM**
Retinoids (anti-acne)	**TRETIN-**
Phosphodiesterase 5 inhibitors	**-AFIL**
Carbonic anhydrase inhibitors	**-LAMIDE**
Progestin (female hormone)	**-TREL**
Atypical antipsychotics	**-RIDONE**

RESPIRATORY

UPPER RESPIRATORY

Second-gen antihistamines (H1 antagonist)	**-ADINE**
Second-gen antihistamines (H1 antagonist)	**-TIRIZINE**
Second-gen antihistamines (H1 antagonist)	**-TICINE**
Nasal decongestants	**-EPHRINE -ZOLINE**

LOWER RESPIRATORY

Beta2-agonists (Bronchodilator)	**-TEROL**
Xanthine derivatives	**-PHYLLINE**
Cholinergic blockers	**-TROPIUM**
Cholinergic blockers	**-CLINDIDIUN**
Immunomodulators & leukotriene modifiers	**-ZUMAB -LUKAST**

ANTIDOTES

Opioids / narcotics	**NALOXONE (NARCAN)**	
Warfarin (Coumadin)	**VITAMIN K**	think war on K
Heparin	**PROTAMINE SULFATE**	
Digoxin	**DIGIBIND**	or Digifab
Anticholinergics	**PHYSOSTIGMINE**	
Benzodiazepines	**FLUMAZENIL (ROMAZICON)**	you can fly fast in a mercedes Benz
Cholinergic crisis	**ATROPINE (ATROPEN)**	
Acetaminophen (Tylenol)	**ACETYLCYSTEINE (MUCOMYST)**	
Magnesium sulfate	**CALCIUM GLUCONATE**	
Iron	**DEFEROXAMINE**	
Lead	**CHELATION AGENTS**	
Lead	**DIMERCAPOL & DISODIUM**	
Alcohol withdrawal	**CHLORDIAZEPOXIDE (LIBRIUM)**	
Beta blockers	**GLUCAGON**	
Calcium channel blockers	**GLUCAGON, INSULIN, OR CALCIUM**	
Aspirin	**SODIUM BICARBONATE**	
Insulin Reaction	**GLUCAGON**	if your insulin is GONE, you give GlucaGON
Pyridoxine	**DEFEROXAMINE**	
Tricyclic antidepressants	**SODIUM BICARBONATE**	
Cyanide	**HYDROXOCOBALAMIN**	

COMMON THERAPEUTICS LEVELS

Digoxin	**0.5 - 2.0** ng/mL **(> 2 = TOXIC)**
Lithium	**0.6 - 1.2** mEq/L
Theophylline	**10 - 20** mcg/dL
Dilantin (Phenytoin)	**10 - 20** mg/L
Magnesium sulfate	**4 - 7** mg/dL
Acetaminophen (Tylenol)	**10 - 20** mcg/mL
Gentamicin	**5 - 10** mcg/mL
Salicylate	**100 - 300** mcg/mL
Vancomycin	Peak: **20 - 40** mcg/mL
	Trough: **5 - 15** mcg/mL
Valporic acid	**50 - 100** mcg

PHARMACOLOGY

NSAIDS

NSAIDS Non-steroidal Anti-Inflammatory Drugs

Gets their name because they produce an anti-inflammatory effect but they are not steroids!

GENERIC	TRADE NAME
Ibu**profen**	Advil
feno**profen**	Nalfon
Flurbi**profen**	–
diclofenac	–
celecoxib	Celebrex
ketorolac	Sprix (nasal spray)
Naproxen	Aleve
Indomethacin	Indocin

SUFFIX: "-PROFEN" "-OLAC"

Inhibits **COX 2** without inhibiting **COX 1**

ACTION

- Anti-inflammatory
- Analgesic
- Antipyretic

Inhibit prostaglandin synthesis by blocking cyclooxygenase (COX)

COX 1
Enzyme that maintains stomach lining

COX 2
Enzyme that triggers pain

This means they inhibit pain, but also inhibit the enzyme that maintains the lining of the stomach!

USES

- Mild to moderate pain
- Menstrual cramps
- ↓ fever
- Musculoskeletal disorders
  - OA & RA

SIDE EFFECTS

- GI upset **MOST COMMON**
  - Nausea / diarrhea / vomiting
  - Anorexia
  - Abdominal pain / discomfort
- Heart
  - HTN & heart failure
- Kidney clogging
  - NSAIDs are nephrotoxic!
- Blood clots
  - Stroke

CONTRAINDICATIONS

PREGNANCY CATEGORY **D**

- Known hypersensitivity to NSAIDs or aspirin
- Clients with clot history
  - MI, CVA, PE, DVT
- Clients with liver, kidney, or bleeding disorders

Certain medications are known to cause bronchospasms in clients with asthma.

We want to "**BAN**" these medications from asthma patients.

B ETA BLOCKERS
A SPIRIN
N SAIDS

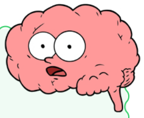
NURSING CONSIDERATIONS

- NSAIDs cause GI upset such as acid reflex
  - Administer proton pump inhibitors (PPI's)
    - ➡ Ompr**azole**
    - ➡ Pantopr**azole**
- Educate: take with food to decrease stomach upset
  - Don't take on an empty stomach

OPIOID ANALGESICS

GENERIC
Hydromorph**one**
Codeine
Oxycod**one**
Fentanyl
morphine sulfate
SUFFIX: -DONE -ONE

ACTION



CNS Depressant

Binds to opioid receptors in the brain which causes an analgesic sedative, & euphoric effect.

THE GOLD STANDARD

- Most commonly used opioid for chronic pain.
- Can be given in many forms:
  (PO, nasally, subcut, IM, IV, & suppository)

USES

- ↓ anxiety & sedate post-op
- ↓ anxiety in those with dyspnea
- Relieve pain (myocardial infarction)
- Manage opioid dependence
- Treat diarrhea & intestinal cramping

Opioids do **NOT** produce an anti-inflammatory effect or an antipyretic effect. So they are not used to reduce fevers or for gout / rheumatoid arthritis.

SIDE EFFECTS

- ↓ GI Function
  - Constipation

LONG TERM SIDE EFFECTS
Client will NOT build tolerance

- ↓ Vital signs
  - ↓ HR
  - ↓ BP (hypotension)
  - ↓ RR
- ↓ CNS function
  - Sedation, insomnia, weakness, dizziness
- Pruritus (itching)
- Nausea
- IV admin
- Burning sensation

SHORT TERM SIDE EFFECTS
Client WILL build tolerance

TOLERANCE VS. DEPENDENCE

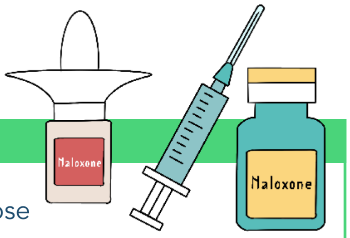
TOLERANCE

The body adapts to the drug (gets used to it)

Higher doses of medication are needed to achieve the same effect!

DEPENDENCE

The body goes through "withdrawals" & experiences negative effects when the medication is STOPPED!



ANTIDOTE: Naloxone (Narcan)

- ➜ Reversal agent for opioid overdose
- ➜ Opioids last longer than the effect of naloxone (Narcan)
- ➜ Repeat doses may be needed

REMEMBER This reverses the opioid's effects and the client's pain will come back!

NURSING CONSIDERATIONS

- Preventative measures for **CONSTIPATION**
  - Adm. stool softeners or laxatives
  - Daily exercise
  - **F**luids, **F**iber, & **F**ruits ➜ **F**ill up the toilet!
  - Encourage client to defecate when they feel the urge (do not wait)
- Client respirations begin to drop
  - Coaching the client to breath may increase the respiratory rate
  - Administer naloxone (Narcan)
- Preventative measures for falls
  - Opioids causes orthostatic hypotension
  - Educate to rise slowly, assist the client with ambulatory activities
  - Keep the room well lit
- Take PO opioids with food to decrease GI upset
- Do not drink ETOH!

TRANSDERMAL PATCH

- ☑ Remove old patch before placing a new one
- ☑ Dispose old patch in the sharps container
- ☑ Date & initial the patch
- ☑ Do not apply over hair
- ☑ Rotate sites
- ☑ Avoid the sun or heat (it increases absorption)

WHEN TO STOP THE MEDICATION:

- ☞ Respiratory depression
  - RR < 12
- ☞ If the client is unarousable

SULFONAMIDES & FLUOROQUINOLONES

OVERVIEW OF ANTIBIOTICS

- Antibiotics and antibacterials are used interchangeably
- Antibiotics are only used for bacterial infection (not viral)
- Finish the entire prescription of antibiotics (even if you are feeling better)
- NO alcohol (antibiotics are hard on the liver)
- A culture & sensitivity test
  - **CULTURE** is a test to determine the type of bacteria
  - **SENSITIVITY TEST** is to determine what kind of medication will work best
  - Always obtain cultures *before* administering an antibiotic

SUPERINFECTION

Antibiotics disrupt the "normal flora" which can cause a super infection (secondary infection)

SULFONAMIDES "SULFA DRUGS"

GENERIC	TRADE NAME
sulfadiazine	–
sulfasalazine	Azulfidine
sulfamethoxazole	Bactrim
PREFIX: "SULF-"	

SIDE EFFECTS

- **GI UPSET!**
  - Nausea, vomiting, anorexia, diarrhea, abdominal pain, stomatitis
- Chills / fever
- Crystalluria
  - Crystals in the urine
- Photosensitivity
  - Increased risk for sunburn!
- **HEMATOLOGIC CHANGES**
  - Leukopenia (↓ WBC's)
  - Thrombocytopenia (↓ platelets)
  - Aplastic anemia (↓ RBC's)

ACTION

Bacteriostatic (slow-growing)

Inhibit folic acid metabolism.

It slows the growth of the bacteria enough for the body to take over with its own defense mechanic (WBC's)

USES

- UTI's (commonly caused by E.coli)
- Acute otitis media
- Ulcerative colitis
- Topical: used for burn wounds

CONTRAINDICATIONS

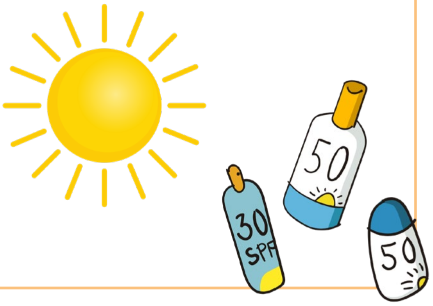
PREGNANCY CATEGORY D

- Hypersensitive to sulfa drugs
- Allergy to sulfonylureas like Glyburide (oral antibiotics)

NURSING CONSIDERATIONS

- Increase **FLUIDS** intake because sulfas dry out the body
- Since sulfas cause photosensitivity, we want to use sunblock and avoid the sun!
- Take folic acid daily
- Patient may bruise easily
  - Monitor skin & handle with care

Sulfa's think SUN BURN!



FLUOROQUINOLONES

GENERIC	TRADE NAME
cipro**floxacin**	Cipro
gemi**floxacin**	Factive
o**floxacin**	Floxin
moxi**floxacin**	Avalox
SUFFIX: "-FLOXACIN"	

SIDE EFFECTS

- **GI UPSET!**
  - Nausea, diarrhea, abdominal pain
- Dizziness
- Photosensitivity

↑ RISK FOR TENDONITIS & TENDON RUPTURE
(Especially the elderly taking corticosteroids)

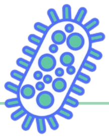
MEMORY TRICK

Your **T**endon is near the **FLOOR** & can rupture due to **FLOOR**oquinolones

ACTION

Interferes with the synthesis of bacterial DNA

(Causes death of the bacterial cell)



USES

- Lower respiratory infections
- Bone & joint infections
- UTI's
- STI's
- Infections of the skin
- Ophthalmic solutions for eye infections

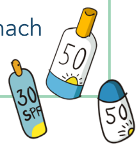
CONTRAINDICATIONS

PREGNANCY CATEGORY C

- Clients with a history of hypersensitivity to the fluoroquinolones
- Children <18 years old
- Give with caution to:
  - Diabetics, those with renal impairment, history of seizures, & the elderly.

NURSING CONSIDERATIONS

- Fluoroquinolones cause photosensitivity. We want to use sunblock and avoid the sun!
- Take on an EMPTY stomach w/ full glass of water



PENICILLIN & CEPHALOSPORINS

PENICILLIN

GENERIC
Peni**cillin** G
Peni**cillin** V
Amoxi**cillin**
Ampi**cillin**
Pipera**cillin**
Oxa**cillin**
SUFFIX: "-CILLIN"

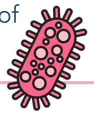
4 TYPES:

- Natural
- Penicillinase-resistant
- Aminopenicillins
- Extended-spectrum

SIDE EFFECTS

- **GI UPSET!**
  - Stomatitis & dry mouth
  - Gastritis, nausea, vomiting, diarrhea, & abdominal pain
- **ORALLY** - Inflammation of the tongue (Glossitis)
- **IM INJECTION** - Pain at the site
- **IV INJECTION** - Irritation & inflammation (Phlebitis)

ACTION



Broad Spectrum Antibiotic

Inhibits the integrity of the bacterial cell wall

USES

- (UTI's)
- Septicemia
- Meningitis
- Intra-abdominal infections
- STI's (syphilis)
- Respiratory infections (pneumonia)

Penicillins are commonly used as Prophylaxis (prevention) against secondary infections.

CONTRAINDICATIONS

PREGNANCY CATEGORY C

- History of allergies to **CEPHALOSPORINS** or **PENICILLIN**
- Renal disease, asthma, bleeding disorders, GI disease

NURSING CONSIDERATIONS

- Pregnancy & breast-feeding safe
- Penicillin makes oral contraceptive ineffective
  - use additional contraceptive
- Educate: take with **FOOD** to ↓ GI upset
- Penicillin allergy is very common!

Penicillin bumps the Pill

CROSS SENSITIVITY

Ask about allergy to **PENICILLIN** or **CEPHALOSPORINS** before administering the first dose!
A client who is allergic to penicillin also may be allergic to cephalosporins.

CEPHALOSPORINS

1ST GENERATION MEDICATIONS

GENERIC	TRADE NAME
Cefadroxil	–
Cefazolin	An**cef**
Cephalexin	Keflex

2ND GENERATION MEDICATIONS

GENERIC	TRADE NAME
Cefaclor	–
Cefoxitin	Mefoxin
Cefotetan	–

3RD GENERATION MEDICATIONS

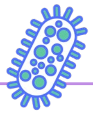
GENERIC	TRADE NAME
Cefdinir	–
Ceftriaxone	Ro**ceph**in
Cefotaxime	Claforan

PREFIXES & SUFFIXES:
"CEF" & "CEPH"

ACTION

Bactericidal - kills bacteria

(Causes death of the bacterial cell)



USES

- Otitis media
- Respiratory infections
- Bone infections
- UTI's
- Use prophylactically pre-opt, intra-opt, and post-opt to prevent infection during surgery.

CONTRAINDICATIONS

PREGNANCY CATEGORY B

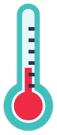
- History of allergies to **CEPHALOSPORINS** or **PENICILLIN**
- Administer with caution: clients with renal disease, hepatic impairment, bleeding disorder

NURSING CONSIDERATIONS

- Cephalosporins make oral contraceptive ineffective
  - use additional contraceptive
- Do NOT drink alcohol while on this medication.

SIDE EFFECTS

- **GI UPSET!**
  - Nausea, vomiting, diarrhea
- Dizziness
- Malaise
- Heartburn
- Fever
- Nephrotoxicity



- Aplastic anemia (↓ RBC's)
- Stevens-Johnson syndrome (SJS)
- Toxic epidermal necrolysis
- **IV INJECTION** - Irritation & inflation (Phlebitis)
- **IM INJECTION** - Pain at the site

TETRACYCLINES & AMINOGLYCOSIDES

GENERIC	TRADE NAME
Tetra**Cycline**	–
Doxy**Cycline**	Atridox
mino**Cycline**	Arestin
demeclo**Cycline**	–
SUFFIX: " -CYCLINE"	

TETRACYCLINES

ACTION

Bacteriostatic (slow-growing)

Inhibits bacterial protein synthesis

SIDE EFFECTS

- **GI DISTRESS!**
  - Nausea / vomiting / diarrhea
  - Stomatitis
- Skin rashes
- Photosensitivity reaction

USES

- **SKIN**
  - Skin & soft tissue infection
  - Severe acne
- Rocky mountain spotted fever
- Helicobacter Pylori (H. pylori)

Tetra think Teeth

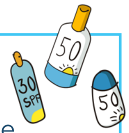
CONTRAINDICATIONS

PREGNANCY CATEGORY D

- Known allergy to tetracyclines
- Contraindicated in lactation

Tetracyclines think Toxic to the developing fetus

NURSING CONSIDERATIONS



- Fluoroquinolones cause photosensitivity. We want to use sunblock and avoid the sun!
- Tetracyclines make oral contraceptives ineffective
  - Use additional contraception
- Take on an EMPTY stomach with a full glass of water
- Causes tooth discoloration
  - Do not give to children younger than 9
- Sit up for 30 min after taking medication
  - Do not lay down
  - Pill induced esophagus (HEARTBURN & scaring of the esophagus!)
- Avoid calcium/dairy products
  - These prevent the absorption of the drug

GENERIC	TRADE NAME
genta**micin**	–
kana**mycin**	–
neo**mycin**	–
strepto**mycin**	–
SUFFIXES: "-MYCIN" & "-MICIN"	

AMINOGLYCOSIDES

SIDE EFFECTS

- **GI DISTRESS!**
  - Nausea / vomiting / anorexia
- Rash & hives

AMinoglycosides are **A** mean antibiotic because they have very harmful side effects.

ACTION

Bactericidal - kills bacteria

Blocks the ribosome from reading the mRNA. Then the bacterial can't multiply.

CONTRAINDICATIONS

PREGNANCY CATEGORY D

- Known allergy to aminoglycosides
- Hearing loss
- Musculoskeletal disorders (Myasthenia gravis & Parkinson's disease)
- Contradicted for location

NURSING CONSIDERATIONS

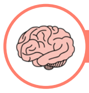
- Monitor:
  - Renal status
  - Neuro status
  - Respiratory status
- Evaluate clients comments related to any hearing issues

USES

- **BOWEL PREPARATION**: Decrease normal flora in the GI for those having abdominal surgery
- Management of hepatic coma
  - Decreasing the ammonia in the intestines

NEPHROTOXICITY **Hurts the kidneys**: Proteinuria hematuria, & increase BUN & Creatinine.

OTOTOXICITY **Hurts the ears**: Tinnitus, vertigo, hearing loss, which may be permanent.



NEUROTOXICITY **Hurts the brain**: Numbness, tumors, convulsions, muscular paralysis.

DIURETICS OVERVIEW

LOOP DIURETIC

GENERIC	TRADE NAME
furosemide	Lasix
bumetanide	Bumex
torsemide	Demadex

ACTION

- Inhibit reabsorption of NA+ & Cl-

Acts on 3 sites
=
↑ reabsorption

PURPOSE

- Hypertension
- Heart failure
- Renal disease
- Edema
- Pulmonary edema

SIDE EFFECTS

- ↓ Hypokalemia ⚠
- ↓ Hypotension
- ↑ Hyperglycemia
- Photosensitivity
- ↓ Hyponatremia
- Dehydration

POTASSIUM WASTING!

REMEMBER **NORMAL POTASSIUM 3.5 - 5.0**

NURSING CONSIDERATIONS

- Obtain baseline vital signs
- Adm. furosemide SLOWLY *(rapid adm. can cause ototoxicity)*

- Replace K+ if < 3.5 mEq/L

THIAZIDE DIURETIC

GENERIC	TRADE NAME
hydrochlorothiazide	Microzide
chlorothiazide	Diuril
methyclothiazide	-

ACTION

- Inhibit reabsorption of NA+ & Cl-
- Excretion of Na+, Cl-, & H2O

↑ UOP
=
↓ blood volume

PURPOSE

- Hypertension
- Heart failure
- Renal disease
- Cirrhosis
- Edema
- Corticosteroids
- Estrogen therapy

SIDE EFFECTS

- ↓ Hypokalemia
- ↓ Hypotension
- ↓ Hyponatremia
- ↓ Libido
- ↑ Hyperglycemia
- Photosensitivity
- Dehydration
- Azotemia

POTASSIUM WASTING!

NURSING CONSIDERATIONS

- Obtain baseline vital signs
- Monitor intake & output
- Give w/ meals to ↓ GI upset
- Replace K+ if < 3.5 mEq/L
  - ➥ **NEVER** give K+ IV push
- Avoid giving to pt.'s with gout
- Monitor renal function
- Daily weights
  - ➥ Same time, same scale!
- Clients with a **sulfa allergy** should avoid thiazide diuretics ⚠

DIURETICS OVERVIEW

DIURETICS

DIURESIS THE BODY

DIURESIS = **D**RY INSIDE

- *WHERE SODIUM GOES...WATER FLOWS!*
- Sodium makes us retain water
  - ➥ Low sodium diet (*SODIUM SWELLS!*)
- Give diuretics in the morning, not at night
  - ➥ You don't want your client peeing all night long (Nocturia)
- Instruct the client to make slow position changes (diuretics cause orthostatic hypotension)
- Monitor...
  - ➥ Daily weights (report 2-3 lbs weight gain)
  - ➥ Intake & output
  - ➥ Vital signs
  - ➥ Potassium levels

OSMOTIC DIURETIC

GENERIC	TRADE NAME
mannitol	Osmitrol

ACTION

- ↑ the thickness of the filtrate so water can't be reabsorbed
- Excretion of Na+ & Cl-

PURPOSE

- Treatment of cerebral edema
- ↓ intraocular pressure (IOP)

SIDE EFFECTS

- Edema
- Blurred vision
- Nausea, vomiting, & diarrhea
- Urinary retention

NURSING CONSIDERATIONS

- Only administered IV
- May crystallize *(check solution before adm.)*
- Perform neuro assessment & LOC *(if using for cerebral edema)*

K+ SPARING DIURETIC

GENERIC	TRADE NAME
spironolactone	Aldactone

Spironolactone is a *potassium sparing diuretic...*
S think **S**paring!

ACTION

- Blocks aldosterone ("salt water" hormone)
- Lets fluid out of the body, into the potty!

- Excretion of Na+ & H2O

NOT K+
(spares potassium)

PURPOSE

- Hypertension
- Edema
- Hypokalemia
- Hyperaldosteronism
- Cross-sex hormonal therapy

SPIRONOLACTONE INHIBITS TESTOSTERONE

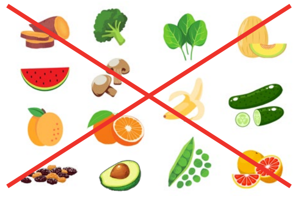
SIDE EFFECTS

- Hyperkalemia (> 5.0)
- Diarrhea
- Gastritis
- Drowsiness
- Erectile dysfunction
- Gynecomastia *(enlargment of the breasts in men)*

EDUCATE:
GYNECOMASTIA IS USUALLY REVERSIBLE AFTER THERAPY HAS STOPPED

NURSING CONSIDERATIONS

- Avoid eating foods high in potassium *(green leafy veggies, melons, bananas, avocado, etc.)*



- Avoid salt substitutes & potassium supplements
- Monitor K+ levels

⚠ Watch out for **HYPERKALEMIA**
(K+ > 5.0 mEq/L)

ANTIHYPERLIPIDEMIC DRUGS

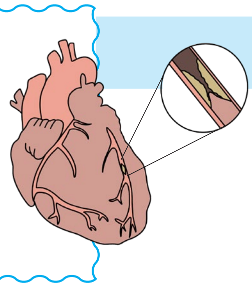
OVERVIEW

- Atherosclerosis is when lipids stick to the blood vessel walls which can obstruct blood flow
- The goal of all antihyperlipidemic drugs is to lower lipid levels in the blood

CHOLESTEROL

LDL → Want LOW Levels (<100 mg/dL)
Low Density Lipoprotein
BAD CHOLESTEROL

HDL → Want HIGH Levels (>60 mg/dL)
High Density Lipoprotein
HAPPY CHOLESTEROL



HMG-COA REDUCTASE INHIBITORS "STATINS"

GENERIC	TRADE NAME
Atorva**statin**	Lipitor
Fluva**statin**	Lescol
Lova**statin**	Altoprev
Pitava**statin**	Livalo
Simva**statin**	Zocor
Rosuva**statin**	Crestor

SUFFIX: " -STATIN "

USES

LOWERS CHOLESTEROL

- Hyperlipidemia
- PRIMARY PREVENTION: Preventable treatment for patients at risk for coronary artery disease (CAD)
- SECONDARY PREVENTION: Stabilizes fatty plaques in clients with current coronary artery disease (CAD)

ACTIONS

- Inhibits the enzyme HMG-CoA Reductase
- Statins are not a cure!

SIDE EFFECTS

NEURO

- Headache
- Nausea
- Dizziness

GI

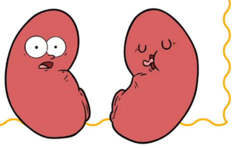
- Constipation
- Cramping
- Abdominal pain
- Hyperglycemia

NURSING CONSIDERATIONS

- Monitor liver enzymes
  - ➡ ALT/AST
- Monitor therapeutic response
  - ➡ Statins should lower LDL, & increase HDL
- Avoid grapefruit consumption
  - ➡ Increases risk for toxicity of statins
- Statins are **pregnancy category X** & should not be taken while breastfeeding
- Monitor for signs of **rhabdomyolysis** because statins have been associated with this

RHABDOMYOLYSIS

- Rare condition where the muscles are damaged
- Myoglobin leaks into the blood which can cause **kidney damage**
- Signs & symptoms:
  - ➡ Muscle pain, tenderness, or weakness
  - ➡ Accompanied by malaise or fever
  - ➡ ↑ creatine kinase levels
  - ➡ Dark urine color (tea or cocoa like urine)



BILE ACID RESINS

GENERIC	TRADE NAME
Cholestyramine	Prevalie
Colestipol	Colestid
Colesevelam	Welchol

USES

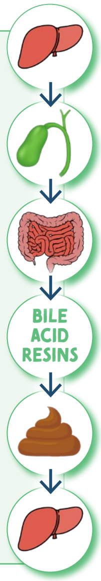
- Hyperlipidemia
- Gallstone dissolution
- Pruritus associated with partial biliary obstruction

SIDE EFFECTS

GI

- Constipation
- Increase risk for bleeding R/T Vit K malabsorption
- Vitamin A & D deficiencies

ACTIONS



Bile is made & secreted by the **liver**
↓
Then, it's stored the **gallbladder**
↓
Once emulsified, the fats & lipids are absorbed in the **intestines**
↓
Bile Acid Resins binds to the bile acid to form an insoluble substance (can not be absorbed by the intestine)
↓
So it's excreted with the **feces**
↓
↓ bile acids = **liver** uses cholesterol to make more bile = ↓ cholesterol

NURSING CONSIDERATIONS

- Bile acid resins may interfere with the digestion of fats, preventing the absorption of **fat-soluble vitamins**
  - **All Kids Eat Donuts**
  - ➡ Vitamin A & D may be given in a water-soluble for long term therapy
- Bile acid resins may cause constipation, so educate to...
  - ➡ Increase fluids, fibers
  - ➡ Exercise regularly
  - ➡ Use stool softener

ANTIHYPERTENSIVES

ACE INHIBITORS

angiotensin-converting enzyme inhibitors

GENERIC	TRADE NAME
Capto**pril**	–
enala**pril**	Vasotec
fosino**pril**	–
lisino**pril**	Prinivil

SUFFIX: "-PRIL"

USES

- Hypertension
- Heart Failure

ACTION

Dilates blood vessels, which lowers blood pressure. They do not directly affect the heart rate.

- Inhibits RAAS Renin-Angiotensin-Aldosteron-System
- RAAS is the main hormonal mechanism involved in regulating the blood pressure
- ACE converts angiotensin I → angiotensin II (a powerful vasoconstrictor)
- Inhibiting ACE will inhibit this vasoconstricting effect, decreasing blood pressure!

SIDE EFFECTS

A = ANGIOEDEMA
C = COUGH (DRY)
E = ELEVATED K+

Orthostatic Hypotension
Dizziness

NURSING CONSIDERATIONS

- Assess BP & pulse routinely
- Monitor for hypotension
  - Educate on changing positions slowly
- Monitor K+ levels
  - Normal 3.5 - 5.0
  - Educate to avoid foods high in potassium & avoid salt substitutes
- Assess for angioedema
  - Swelling of the area beneath the skin or mucosa *(deep edema)*
  - **DANGEROUS**: swelling of the face & mouth
- Educate to not suddenly stop the medication it can cause **rebound hypertension** *(needs to be tapered off)*
- Ace inhibitors are contraindicated in pregnancy due to the teratogenic effects on the fetus

BETA BLOCKERS

GENERIC	TRADE NAME
acebuto**lol**	Sectral
metopro**lol**	Corgard
proprano**lol**	Inderal
nado**lol**	Bystolic

SUFFIX: "-LOL"

USES

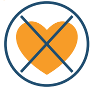
- Hypertension
- Stable angina
- Chronic / compensated heart failure (not acute heart failure)
- Dysrhythmias

ACTION

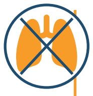
- Blocks norepinephrine & epinephrine (fight or flight hormones)
- Blocks the negative effects of the sympathetic nervous system
  - ➡ Beta blockers can be selective or non-selective
    - Meaning they can block different beta sites (beta 1 and/or beta 2)

↓ Resistance
↓ Workload
↓ Cardiac Output

BETA 1
(one heart)



BETA 2
(two lobes)



SIDE EFFECTS

THE **B**'S OF BETA BLOCKERS

- **B**radycardia & heart **B**locks
- **B**reathing problems
  - ➡ Bronchi spasms
- **B**ad for heart failure patients (in an acute setting)
- **B**lood sugar masking
  - ➡ Masks S&S of hypoglycemia (low blood sugar)
- **B**lood pressure lowered - Hypotension

NURSING CONSIDERATIONS

- Monitor for hypotension
- Educate on changing positions slowly
- Do not give non-selective beta blockers to asthma patients or COPD patients (*remember: non-selective works on Beta1 & **Beta2** = **Lung** constriction*)
- Educate to not suddenly stop the medication. It can cause rebound hypertension *(needs to be tapered off)*
- Monitor for S&S of heart failure
  - These medications produce inotropic effects (↑ contraction strength of the ♥)
  - S&S of ♥ failure: Wet lung sounds, weight gain, edema, etc

ANTIHYPERTENSIVES

CALCIUM CHANNEL BLOCKERS

VERY
NICE
DRUGS

GENERIC	TRADE NAME
Verap**amil**	Calan
Nife**dipine**	Procardia
Diltiazem	Cardizem
Amlo**dipine**	Norvasc
Nicar**dipine**	Cardine

SUFFIX: " DIPINE" "-AMIL"

USES

LOWER HR & BP

- Hypertension
- Angina
- Dysrhythmias

SIDE EFFECTS

- Orthostatic hypotension
- Dizziness
- Flushing
- Headache
- Peripheral edema
- Constipation

ALL COMMON SIDE EFFECTS

ACTION

Blocks movement of calcium

(↓ calcium = ↓ available for transmission of nerve impulses)

- Relaxes blood vessels
- ↓ blood pressure
- ↑ supply of oxygen to the heart
- ↓ ❤'s workload

NURSING CONSIDERATIONS

- Antihypertensives cause **orthostatic hypotension**
  - Change positions slowly
  - Sit on the side of the bed for a few minutes before standing
- Educate to not suddenly stop the medication. It can cause **REBOUND HYPERTENSION** (needs to be tapered off).

- Do not drink grapefruit juice
- Leg elevation & compression to reduce edema
- To help with **CONSTIPATION**:

CAN CAUSE SERVERE HYPOTENSION!

Fluids, Fiber, & Fruits
Fill up the toilet!

ANTICOAGULANTS

Prevents new clots or prevents current clots from getting bigger! Anticoagulants do not dissolve clots & do not thin the blood. Anticoagulants are use for clients who are at an increased risk for **CLOT FORMATION!**

WARFARIN

GENERIC	TRADE NAME
warfarin	Coumadin

ACTION

- Interferes with the production of **VITAMIN K**
  - ➥ **USED IN THE LIVER TO MAKE CLOTTING FACTORS**
- ↓ of clotting factors II (prothrombin), VII, IX, and X. (Prothrombin is required for the clotting)

USES

- **LONG-TERM THERAPY**
- Works slowly (a few days to take effect)

ROUTES

- Orally
- Parenteral admin

SAFE DURING PREGNANCY? ☒ **NO!**

ANTIDOTE: VITAMIN K Think: Vitamin **K** - **K**ills Heparin

NURSING CONSIDERATIONS

- Educate client to be consistent with their vitamin K food intake (green leafy vegetables, liver, etc.)
- Antibiotics increase the risk for **BLEEDING** (they increase INR)
- Will have freq. blood test to check therapeutic range
- Educate to take the pill at the same time every day

Can a patient be on *both* at the same time?

YES!
Commonly used together. Gives time for Warfarin to kick in!

HEPARIN

ACTION

Heparin inhibits the formation of fibrin clots. Inhibits the conversion of fibrinogen to fibrin (inactivates factors needed for the clotting)

USES

- **SHORT-TERM THERAPY**
- Works quickly

ROUTES

- **NOT** given orally
- Given by injection (IV or subq)
- IV drip

Heparin is inactivated by gastric acid in the stomach

SAFE DURING PREGNANCY? ☑ **YES!**

ANTIDOTE: PROTAMINE SULFATE

LOW MOLECULAR WEIGHT HEPARIN (LMW)

GENERIC	TRADE NAME
enoxa**parin**	Lovenox
Dalte**parin**	Fragmin
SUFFIX: "-PARIN"	

LMW HEPARIN IS ADMINISTERED:

- Subq in the belly
- 2 inches from the umbilicus
- 90 degree angle!
- After subq injection, it's common to have brusing, irritation, & pain!
- Do not massage injection site after

For LMW heparins, we don't look at blood coags.
We want to monitor **PLATELET COUNT**!
Heparin Induced Thrombocytopenia **(HIT)**
Should check platelets while on LMW.
Normal PLT count: **150,000 - 400,000**

COAGULATION

NOT ON ANY ANTICOAGULANT:
PT: 10 - 12 seconds
INR: < 1
aPTT: 30 - 40 seconds

ABBBREVIATIONS:
PTT: Prothrombin Time
aPTT: Activated Partial Thromboplastin Time
INR: International Normalized Ratio

INTERPRETATION:
Numbers are TOO high = Patient will die (increased bleeding)
Numbers are **LOW** = Clots will **GROW**

WARAFIN
Measured with: INR

THERAPUTIC RANGE:
1.5 - 2 times the normal value
INR: **2 - 3**
INR: **2.5 - 3.5**
(Heart valve replacement)

HEPARIN
Measured with: aPTT

THERAPUTIC RANGE:
1.5 - 2 times the normal value
aPTT: **47 - 70 SECONDS**

DIGOXIN

MEDICATION CLASS: **CARDIAC GLYCOSIDES**

USES

- Heart failure
- Cardiogenic shock
- Antiarrhythmic
  - Atrial fibrillation

ACTION

- **(+) INOTROPIC ACTIVITY**
  - Increases the force of the contraction = increased cardiac output
- **(-) CHRONOTROPIC**: beats slower
- **(-) DROMOTROPIC**: slows impulses sent through AV node, able to squeeze more blood

TOXICITY

THERAPEUTIC RANGE: 0.8 - 2.0 NG/ML

> 2 = Think Toxic

SIGNS OF TOXICITY

Report these to the HCP

GI SYMPTOMS — EARLY SIGN

Nausea, vomiting, diarrhea

VISUAL SYMPTOMS

Blurred vision, yellow or green vision, halo effect around dark object

NEUROLOGICAL SYMPTOMS

Headache, drowsiness, confusion, disorientation

ANTIDOTE: DIGIBAND

GENERIC	TRADE NAME
Digoxin	Lanoxin

CAUSES OF TOXICITY?

D Decreased potassium (**HYPO**kalemia) **<3.5** mEq/L

- Potassium wasting diuretics (Loop)

I Injured kidneys

G GFR decreased (the elderly)

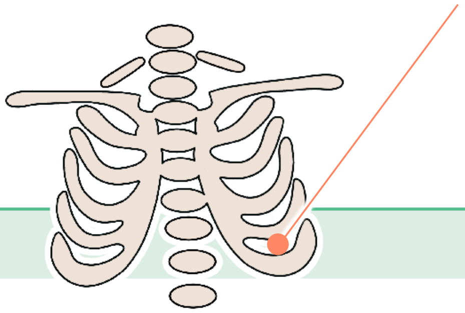
Digoxin is almost solely excreted by the kidneys

NURSING CONSIDERATIONS

- **HOLD THE MEDICATION IF**
  - Adults: <60 bpm
  - Children: <70 bpm
  - Infants: <90-110 bpm
- **KEEP ALL APPOINTMENTS**: drug levels & electrolytes will be monitored

THE APICAL PULSE MUST BE ASSESSED FOR 1 MINUTE BEFORE ADMINSTERING DIGOXIN

The **APICAL PULSE** is located at the fifth intercostal midclavicular space.



- The apex of the heart
- Point of maximal impulse (PMI)
- Mitral valve

NITROGLYCERIN (NTG)

MEDICATION CLASS: ANTIANGINALS

USES

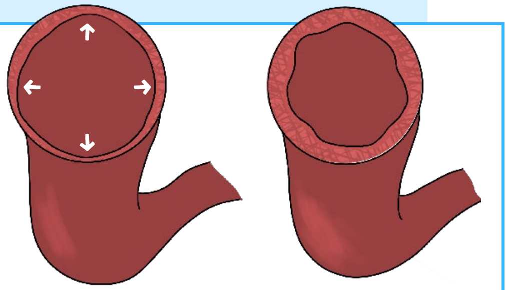
- Angina (chest pain)
- Prevent angina attacks
- Acute coronary syndrome

ACTION

- **VASODILATOR**

Dilators do the following:

- **D**ecrease blood pressure
- **D**ilates vessels
- ↓ Vascular resistance



D = decrease cardiac workload
D = decrease oxygen consumption

SIDE EFFECTS

THE H's

H = **H**eadache
H = **H**ypotension (orthostatic)
H = **H**ot flushing of the face

- Rash
- Sublingual
  - Tingling / burning sensation
- Transdermal
  - Contact dermatitis

ALARMING SIGNS

- Lack of coordination
- Lightheadedness
- Pallor
- Irritable

CONTRAINDICATIONS

PREGNANCY CATEGORY C

- Known hypersensitivity to nitroglycerin
- Allergy to adhesive (transdermal)
- Clients taking phosphodiesterase (PDE) inhibitors
- Head trauma, cerbral hemorrhage
- Severe anemia

QUICK VS. SLOW ONSET

QUICK	SLOW
IV	Nitro patch
Sublingual tabs	Nitro ointment
Transligual spray	Sustained-release tablets

NURSING CONSIDERATIONS

DO NOT TAKE with phosphodiesterase (PDE) inhibitors (erectile dysfunction (ED) drugs)

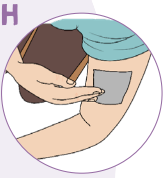
Ends in "**-afil**" Like silden**afil** (viagra)
Causes dangerously low blood pressure resulting in death

LONG ACTING NITRATES DESIRABLE OUTCOME:
The client can perform activities without chest pain (shower, get dressed, etc)

- Monitor blood pressure
  - Stop the medication if systolic BP drops below 100 or the baseline drops below 30 mmHg
- Increased risk for falls due to orthostatic hypotension
  - Educate: rise slowly when getting up

PATIENT EDUCATION

TOPICAL & TRANSDERMAL PATCH



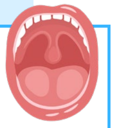
- Remove prior dose
- Rotate sites
- Place over a clean/hairless area
- Wear gloves
- Do not rub nitro ointment into the skin, it can cause rapid absorption!
- Patches can be worn in the shower

SUBLINGUAL NTG OR SPRAY

1 tab/spray sublingual every **5** minutes, up to **3** doses.

If angina is not relieved or is worse 5 min after the first dose, call 911!

SUBLINGUAL OR BUCCAL



- Place **BUCCAL** tablet between the cheek and gum
- Place **SUBLINGUAL** under the tongue
- Rinse with water before placing the tablets in your cheek

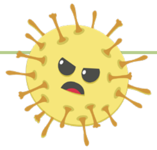
GLYCERYL TRINITRATE TABLETS

☞ Keep in original container (dark, glass bottle) in a dry, cool place.
☞ Do not swallow or chew these tablets

CORTICOSTEROIDS

GENERIC	TRADE NAME
Predni**sone**	Delt**asone**
Hydrocorti**sone**	Hydrocort
Dexameth**asone**	Ozurdex
Flutic**asone**	Flovent HFA
Beclometh**asone**	–
Flunisol**ide**	Aerospan
Ciclesonide	Zetonna
SUFFIX: "SONE" "ASONE" "IDE"	

ACTION



ANTI-INFLAMMATORY EFFECTS!

➥They reduce the number of mast cells in the airway

THERAPUTIC USES

- COPD
- Rheumatoid arthritis
- Lupus

Can also be administered:
IV, IM, PO, rectally, ocularly

TOPICAL CORTICOSTEROIDS

Dermatitis
Rashes
Eczema
Insect bites

INHALED CORTICOSTEROIDS (ICSS)

Chronic asthma

Nasal polyps
& rhinitis

SIDE EFFECTS

S's of Steroids

Steroids cause...

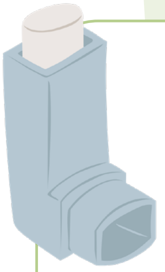
- **Sugar**: Hyperglycemia
- **Soft Bones**: Causes osteoporosis
- **Sick**: Decreased immunity / sepsis
- **Sad**: Depression
- **Salt**: Water & salt retention (hypertension)
- **Sex**: Decreased libido
- **Swollen**: Water gain = weight gain
- **Sight**: Risk for cataracts

PATIENT EDUCATION

(Long-term corticosteroid replacement)

- Report signs of an **INFECTION**
  - Corticosteroids are immunosuppressing and can cause an infection
  - Since they are anti-inflammatory, it may hide the fact that the client has an infection
- Increase **CALCIUM** in the diet
  - Corticosteroids can cause osteoporosis & muscle weakness
- Yearly optometrist appointment
  - Corticosteroids may cause **CATARACTS**
- **STRESS OR SURGERY** causes a decrease in cortisol
  - You may need to increase your dose in times of stress
- Never stop steroids suddenly
  - Slowly taper off the medication!

IMPORTANT TEACHING!



After administration, rinse the mouth to decrease the risk of contracting a possible fungal infection from candidiasis

THRUSH: a type of yeast infection

TAKING Bronchodilators & Corticosteroids?

1. **B**ronchodilator first (to help open up the airways)
2. Wait 5 minutes
3. Administer the **C**orticosteroid

MEMORY TRICK

B comes before **C** in the alphabet

A B C

BRONCHODILATORS (SABA & LABA)

SHORT-ACTING BETA2 AGONISTS (SABA'S)

GENERIC	TRADE NAME
albuterol	Proventil
epinephrine	Adrenalin
levalbu**terol**	Xopenex
terbutaline	–

Think **A**lbuterol is for **A**cute **A**sthma **A**ttacks

LONG-ACTING BETA2 AGONISTS (LABA'S)

GENERIC	TRADE NAME
salme**terol**	–
formo**terol**	Foradil
indaca**terol**	Arcapta
arformo**terol**	Brovana

SUFFIX: "TEROL"

Think **S**almeterol is for **S**low and **S**teady working a LONG time

ACTION

BRONCHO-DILATORS

Dilates (opens up) the bronchi

When an agonist binds to the beta-2 receptors the sympathetic nervous system "Fight or flight" takes effect. **THE AIRWAYS RELAX AND DILATE WHICH INCREASES OXYGEN FLOW** which makes it easier to breathe.

MEMORY TRICK

To remember that beta-**2** receptors are in the lungs: you have **TWO LUNGS**

To remember beta-**1** receptors found on the heart: you only have **ONE HEART.**

BETA 1
(one heart)

BETA 2
(two lobes)

ACTION

SHORT-ACTING BETA2 AGONISTS (SABA'S)

Acute symptom relief

- Bronchospasms
- Asthma

LONG-ACTING BETA2 AGONISTS (LABA'S)

Long-term management

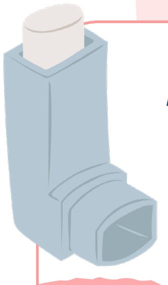
- COPD
- Chronic Bronchitis
- Prevention of bronchospasms

Airway Dysfunction

SIDE EFFECTS

- Tachycardia
- Palpitations
- Cardiac arrhythmias
- Hypertension
- Nervousness & anxiety
- Insomnia

REMEMBER Think **FIGHT OR FLIGHT!**



IMPORTANT TEACHING!

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THRUSH: a type of yeast infection

PATIENT EDUCATION

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2. Wait 5 minutes
3. Administer the **C**orticosteroid

MEMORY TRICK

B comes before **C** in the alphabet

A B C

BRONCHODILATOR (Xanthine derivatives) (Methylxanthines)

GENERIC	TRADE NAME
amino**phylline**	–
dy**phylline**	Lufyllin
oxtri**phylline**	Choledyl SA
theo**phylline**	Theochron

SUFFIX: "PHYLLINE"

THEOPHYLLINE

Therapeutic levels
10 – 20 mcg/dL

Toxic **>20** mcg/dL

SIGNS OF TOXICITY

- **Tonic clonic seizures**
- **Tachycardia & dysrythmias**

ACTION

BRONCHO-DILATORS
Dilates (opens up) the bronchi

Stimulate the central nervous system (CNS) to promote bronchodilation.

Relaxation of the smooth muscles of the bronchi.

USES

- Relief & prevention of bronchial asthma
- Tx of bronchospasms seen in COPD

SIDE EFFECTS

- Tachycardia
- Palpitations
- ECG changes
- Nervousness & anxiety
- Irritable

REMEMBER Think FIGHT OR FLIGHT!

CHOLINERGIC BLOCKING (Anticholinergic)

ALSO CALLED:

- **ANTICHOLINERGIC DRUGS**
- **CHOLINERGIC BLOCKERS**
- **PARASYMPATHOLYTIC DRUGS**

GENERIC	TRADE NAME
a**clidinium**	Tudorza
ume**clidinium**	Incruse
ipra**tropium**	Atrovent
tio**tropium**	Spiriva

SUFFIXES: "-TROPIUM" "-CLINDIDIUN"

Inhaled anticholinergic medications

ACTION

Cholinergic blocking drugs **BLOCK THE PARASYMPATHETIC NERVE** that causes the airway to constrict.

By blocking this, it allows the airways to remain open.

SIDE EFFECTS

BLOCKS SECRETIONS → Dry Inside

- Can't See - Blurred vision
- Can't Pee - Dysuria
- Can't Spit - Dry mouth
- Can't Poop - Constipation

RESPIRATORY USES

Prevention of bronchospasms associated with COPD

PATIENT TEACHING

- Prevent constipation
  - Increase fluids & fiber
- To help with the dry mouth, increase fluids & suck on hard candies.

Fluids, Fiber, & Fruits Fill up the toilet!

Anticholinergic drugs are used for many other purposes as well, such as:
PARKINSONISM, PEPTIC ULCER, VAGAL NERVE–INDUCED BRADYCARDIA & PREOPERATIVE REDUCTION OF ORAL SECRETIONS.

LITHIUM CARBONATE

PSYCHIATRIC MEDS

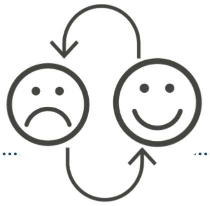
MOOD STABILIZER:

Known for its side effects and narrow therapeutic range

THERAPEUTIC RANGE:
0.6 - 1.2 mEq/L

USES

Bipolar disorder
Helps regulate the "mood swings" (depression & mania)



TOXICITY!

- Confusion
- Blurred vision
- Diarrhea
- Tinnitus
  Ringing in ears
- Slurred speech
- Coma
- Convulsions

TOXICITY LEVELS

Mild: 1.5 - 2 mEq/L

Moderate: 2 - 3 mEq/L

Severe: > 3 mEq/L

ADVERSE REACTIONS

- Nausea
- Vomiting
- Thirst
- Polyuria
- Tremors
- Weight gain

HOW DOES TOXICITY HAPPEN?

- Dehydration
  causes ↑ lithium levels in blood
- Hyponatremia
- Old age
  ↓ *kidney function*...this means lithium builds up in the blood

EDUCATION

- Carry ID that shows you are taking lithium
- Educate on signs & symptoms of toxicity
- Educate and stress importance of taking medication regularly
- Serum lithium levels should be checked every 1-2 months
- Do not operate heavy machinery or drive
- Educate on drinking plenty of water to avoid dehydration (therefore avoiding toxicity)
- Avoid starting a low salt diet
  Sudden ↓ in salt = ↑ in lithium

CONTRADICTIONS

- Pregnancy category D:
  Contradicted in pregnancy & breastfeeding
- Renal / cardiovascular disease
- Dehydrated patients
  Excessive diarrhea or vomiting
- Receiving diuretics
- Sodium depletion
- Hypersensitivity to tartrazine

ANTIDEPRESSANT DRUGS

PSYCHIATRIC MEDS

SSRI's

Selective serotonin
reuptake inhibitor

SNRI's/DNRI's

Serotonin / Norepinephrine
&
Dopamine / Norepinephrine reuptake inhibitor

ACTION

SSRI's: Inhibits uptake of serotonin = ↑ serotonin

Think **S**miley **S**erotonin

SNRI's/DNRI's: Affects serotonin, norepinephrine & dopamine

USES

SSRI's:

- Depression
- Anxiety
- OCD
- Eating disorders

SNRI's/DNRI's:

- Depressive episodes
- Anxiety disorders
- Fibromyalgia
- Diabetic neuropathy pain

SIDE EFFECTS

SSRI's:

NEURO

- Headache
- Tremors
- Difficulty sleeping

GI

- Nausea
- Dry mouth / thirst
- Constipation
- Urinary retention
- Sexual dysfunction

3 S's OF SSRI's

- **S**erotonin syndrome
- **S**exual dysfunction
- **S**tomach issues

SEROTONIN SYNDROME

- Too much serotonin in the brain
- Mental changes
- Tachycardia
- Tightness in muscles
- Difficulty walking
- ↑ BP & temp

SNRI's/DNRI's:

NEURO

- Headache
- Dizziness
- Vertigo
- Photosensitivity
- Agitation/tremors
- Insomnia

GI

- Dry mouth/thirst
- Dehydration
- Constipation
- Nausea/diarrhea

NURSING CONSIDERATIONS

SSRI's:

- May take 4-6 weeks to take effect
  Educate on the importance of compliance
- Take medication in the morning
- **First line** drug for depression/anxiety

⚠ SUICIDE WARNING ⚠

A client who had suicidal plans may now have the **energy** due to the medication to carry out the plans!

SNRI's/DNRI's:

- May take 4-6 weeks to take effect
  Educate on the importance of compliance
- Do not mix with TCA's or MAOI's
- **Zyban** is used for smoking cessation. Do not use it while taking bupropion for depression – it could cause ***overdose***.

DRUG TABLE

SSRI's:

GENERIC	TRADE NAME
sertraline	Zoloft
citalopram	Celexa
escitalopram	Lexapro
fluoxetine	Prozac
vilazodone	Viibryd

SUFFIXES

-talopram, -oxetine, -zodone

SNRI's/DNRI's:

GENERIC	TRADE NAME
bupropion	Zyban & Wellbutrin
duloxetine	Cymbalta
venlafaxine	Effexor XR
milnacipran	Savella
nefazodon	–

SUFFIXES

-faxine, -zodone, -nacipram

ANTIDEPRESSANT DRUGS

PSYCHIATRIC MEDS

TCA's

Tricyclic antidepressants

MAOI's

Monoamine oxidase inhibitor

ACTION

Blocks reuptake of serotonin & norepinephrine in the brain

Blocks monoamine oxidase which causes ↑ in epinephrine, norepinephrine, dopamine, & serotonin, which causes stimulation of the CNS!

USES

- Depressive episodes
- Bipolar disorder
- OCD
- Neuropathy
- Enuresis

Depression

SIDE EFFECTS

- Constipation
- Dry mouth
- Drowsiness
- Blurred vision
- Orthostatic hypotension
- Urine retention
- Cardiotoxic

Causes heart problems in patients with pre-existing cardiac conditions or elderly clients...give with caution!

NEURO

- Orthostatic hypotension
- Dizziness
- Blurred vision

GI

- Constipation
- Dry mouth
- Nausea/ vomiting

HYPERTENSIVE CRISIS

- Headache
- Stiff neck
- Nausea / vomitting
- Fever
- Dilated pupils

Seek medical help to ↓ blood pressure

NURSING CONSIDERATIONS

- May take 2- 3 weeks to take effect
  Educate on the importance of compliance
- **WAIT** 14 days after being off MAOI's to start taking TCA's
- **Amoxapine** is not an antipsychotic drug but similar to these drugs, it may cause TD & NMS (D/C the drug immediately if these symptoms occur)

- Can take up to 4 weeks to reach therapeutic levels
  Educate on the importance of compliance
- Educate on the signs & symptoms of HTN crisis
- Avoid foods with Tyramine
  - Aged cheese
  - Fermented meats
  - Chocolate
  - Caffeinated beverages
  - Sour cream & yogurt

DRUG TABLE

GENERIC	TRADE NAME
amitriptyline	–
amoxapine	–
clomipramine	Anafranil
protriptyline	Vivactil
nortriptyline	Pamelor

SUFFIXES
-triptyline, -pramine

GENERIC	TRADE NAME
phenelzine	Nardil
tranylcypromine	Parnate
isocarboxazid	Marplan

ANTIANXIETY DRUGS (ANXIOLYTICS)

BENZODIAZEPINES

RX

Bipolar disorder
Benzo's are mainly prescribed for acute anxiety, sedation/muscle relaxant, seizures, & alcohol withdrawal

***Not** a first-line drug for treating long-term psychiatric anxiety conditions*

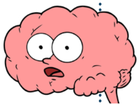
GENERIC	TRADE NAME
alprazolam	Xanax
lora**zepam**	Ativan
dia**zepam**	Valium
clona**zepam**	Klonopin
chlordiazepoxide	Librium
SUFFIXES	
-zolam & -zepam	

Antidote: FLUMAZENIL

ACTION

Binds to cell receptors enhancing the effects of GABA

GABA (inhibitory neurotransmitter)
slows/calms the activity of the nerves in the brain



ADVERSE DRUG REACTIONS (ADR'S)

- Mild drowsiness, sedation
- Lightheadedness, dizziness, ataxia
- Visual disturbances
- Anger, restlessness
- Nausea, constipation, diarrhea
- Lethargy, apathy, fatigue
- Dry mouth

NURSING CONSIDERATIONS TO HELP WITH ADR'S

Take at night if it makes you dizzy/drowsy
Rise slowly from sitting or lying
Do not drive or operate heavy machinery

Fluids, fiber, & exercise!
Give with food to ↓ GI upset

Sips of water, suck on hard candy, chewing sugar-free gum

SYMPTOMS OF WITHDRAWAL

Withdrawals typically happen when the medication is stopped abruptly or taken for >3 months

- ↑ Anxiety
- ↑ HR
- ↑ BP
- ↑ Temp/sweating
- ↓ Memory
- Agitation
- Seizures/tremors
- Insomnia
- Vomiting
- Muscle aches

NURSING CONSIDERATIONS

- Not meant for long term therapy because ↑ risk for physical & psychological **DEPENDENCE**
- Use of long term therapy leads to **TOLERANCE**
  Larger doses of the drug are required to achieve the desired outcome
- Must be **TAPERED**
  ↓ the dosage gradually.
  NEVER stop the medication abruptly!

CONTRAINDICATIONS & PRECAUTIONS

- Pregnant, laboring & lactating women (Preg Category D)
- Elderly (↑ chance of dementia)
- Impaired liver or kidney function
- Debilitation

NONBENZODIAZEPINES

ACTION

Depends on the drug

buspirone (Buspar)
acts on serotonin receptors

hydroxyzine (Vistaril)
acts on the hypothalamus & brainstem reticular formation

GENERIC	TRADE NAME
buspirone	Buspar
doxepin	Silenor
hydroxyzine	Vistaril
meprobamate	–

ANTIPSYCHOTICS

Most commonly used for psychosis (schizophrenia)

REVIEW: Why are SGA's better than FGA's?
SGA's work on both positive & negative symptoms, and have a lower risk of developing tardive dyskinesia (TD).

FIRST GENERATION ANTIPSYCHOTICS (FGA's)

Also called **TYPICAL/CONVENTIONAL**

GENERIC	TRADE NAME
chlorpromazine	–
haloperidol	Haldol
loxapine	Adasuve

SECOND GENERATION ANTIPSYCHOTICS (SGA's)

Also called **ATYPICAL**

GENERIC	TRADE NAME
risperidone	Risperdal
clozapine	Clozaril
quetiapine	Seroquel
ziprasidone	Geodon
aripiprazole	Abilify

ACTIONS OF FGA's

- Blocks/inhibits dopamine from being released in the brain
- Helps diminish positive symptoms of schizophrenia

ACTIONS OF SGA's

- Acts on both serotonin & dopamine in the brain
- Helps diminish positive symptoms of schizophrenia & helps negative symptoms as well!

SIDE EFFECTS OF FGA's

- Higher risk of TD, EPS, & NMS
- Orthostatic hypotension

SIDE EFFECTS OF BOTH

- Anticholinergic effects
- Photophobia
- Photosensitivity
- Sedation/lethargy

SIDE EFFECTS OF SGA's

- Lower risk of TD, EPS & NMS
- ↑ Weight
- ↑ Cholesterol
- ↑ Triglyceride
- ↑ Blood sugar

TARDIVE DYSKINESIA (TD)	• Involuntary movements of the face, tongue, or limbs that may be irreversible.
EXTRAPYRAMIDAL SYNDROME (EPS)	• Parkinson's like symptoms • Akathesia (restlessness) • Dystonia (muscle twitching)
NEUROLEPTIC MALIGNANT SYNDROME (NMS)	• Combination of symptoms: EPS, high fever, & autonomic disturbance • One can recover 7-10 days after DC of medication, but it can be fatal if not treated in time

CONTRAINDICATIONS

- Hypersensitivity
- Comatose client
- Depressed
- Bone marrow depression
- Blood dyscrasias
- Parkinson's disease
- Liver problems
- Coronary artery disease
- Hyper or hypotension

NURSING CONSIDERATIONS

- Educate that it may take 6 - 10 weeks to take effect
- Tell client about adverse reactions and emphasize that adherence is very important

FGA's

- Teach S&S of TD, EPDS, & NMS!
- Advise the client to get up slowly

SGA's

- Check labs *(blood sugar, LDL, triglycerides)*
- To decrease the risk of gaining weight, advise the client about exercise, low-calorie diet, & monitor their weight.

TEMPLATES & PLANNERS

Tear these pages out and make copies, as many as you need!

NURSING DIAGNOSIS

SUPPORTING DATA

GOALS

↔

NURSING DIAGNOSIS

SUPPORTING DATA

GOALS

PATIENT INFO

MEDICAL HISTORY

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NURSING DIAGNOSIS

SUPPORTING DATA

GOALS

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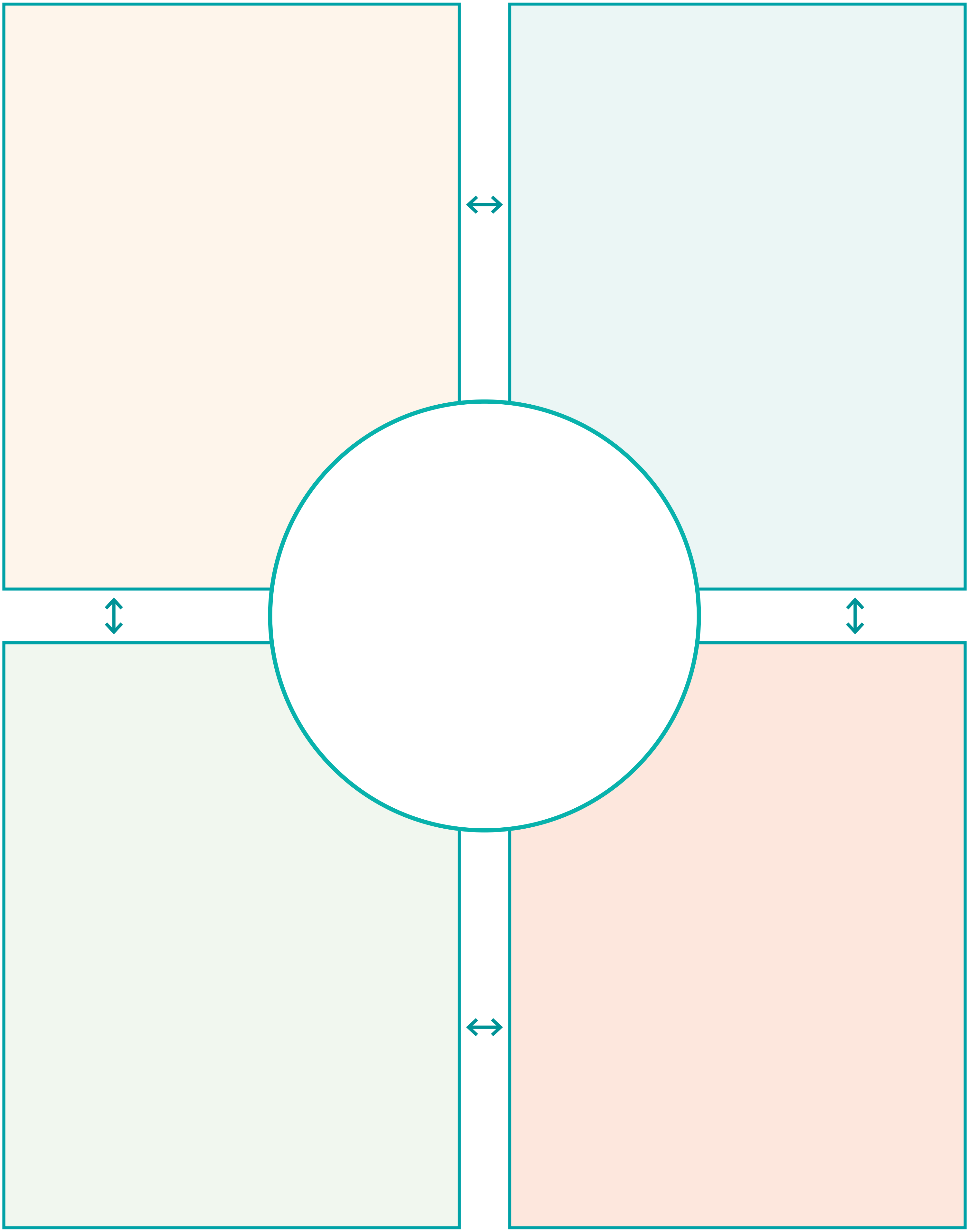
NURSING DIAGNOSIS

SUPPORTING DATA

GOALS



Course Tracker

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Test / Quiz Tracker

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HOURLY Planner

MONTH: ____________________

☐ SUNDAY	☐ MONDAY	☐ TUESDAY	☐ WEDNESDAY	☐ THURSDAY	☐ FRIDAY	☐ SATURDAY
PRIORITIES	PRIORITIES	PRIORITIES	PRIORITIES	PRIORITIES	PRIORITIES	PRIORITIES
6 AM	6 AM	6 AM	6 AM	6 AM	6 AM	6 AM
7 AM	7 AM	7 AM	7 AM	7 AM	7 AM	7 AM
8 AM	8 AM	8 AM	8 AM	8 AM	8 AM	8 AM
9 AM	9 AM	9 AM	9 AM	9 AM	9 AM	9 AM
10 AM	10 AM	10 AM	10 AM	10 AM	10 AM	10 AM
11 AM	11 AM	11 AM	11 AM	11 AM	11 AM	11 AM
12 PM	12 PM	12 PM	12 PM	12 PM	12 PM	12 PM
1 PM	1 PM	1 PM	1 PM	1 PM	1 PM	1 PM
2 PM	2 PM	2 PM	2 PM	2 PM	2 PM	2 PM
3 PM	3 PM	3 PM	3 PM	3 PM	3 PM	3 PM
4 PM	4 PM	4 PM	4 PM	4 PM	4 PM	4 PM
5 PM	5 PM	5 PM	5 PM	5 PM	5 PM	5 PM
6 PM	6 PM	6 PM	6 PM	6 PM	6 PM	6 PM
7 PM	7 PM	7 PM	7 PM	7 PM	7 PM	7 PM
8 PM	8 PM	8 PM	8 PM	8 PM	8 PM	8 PM
9 PM	9 PM	9 PM	9 PM	9 PM	9 PM	9 PM
PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!	PRODUCTIVITY METER BAD GOOD GREAT!

MONTHLY Planner

MONTH: ______________________________ YEAR: __________

MONDAY:

TUESDAY:

WEDNESDAY:

THURSDAY:

FRIDAY:

SATURDAY:

SUNDAY:

WEEKLY Planner

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NOTES

TESTS / EXAMS

PROJECTS / ASSIGNMENTS

SELF-CARE ♥

DISEASE:

PATHOLOGY

SIGNS & SYMPTOMS

RISK FACTORS

COMPLICATIONS

DIAGNOSIS

TREATMENT

PHARMACOLOGY

GENERIC NAME:

BRAND NAME:

DRUG CLASS:

SUFFIXES OR PREFIXES

ACTION

THERAPEUTIC USES

SIDE EFFECTS

CONTRAINDICATIONS

NURSING CONSIDERATIONS

ANTIDOTE?

PATIENT EDUCATION

PHARMACOLOGY

GENERIC NAME:

BRAND NAME:

DRUG CLASS:

SUFFIXES OR PREFIXES

ACTION

THERAPEUTIC USES

SIDE EFFECTS

CONTRAINDICATIONS

NURSING CONSIDERATIONS

ANTIDOTE?

PATIENT EDUCATION

Dear future nurse,

You may be stressed, you may feel tired, and you may want to give up. Nursing school is hard, there's no doubt about it. Everyone cries, everyone has meltdowns, and there will be moments you don't feel qualified for the task at hand. But take heart, the challenge only makes you stronger. Put in the work, show up on time, and find an amazing study group. You got this! ☺

— Kristine Tuttle, BSN, RN

You got this, future nurse!

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